

UNIT-IX**(DEFINITE INTEGRATION)****(1 mark each)**

1. $\int_0^1 \frac{2x}{5x^2+1} dx$ 1
2. $\int_{-1}^1 x^{25} \cos^4 x dx$ 1
3. $\int_0^1 e^{-x} dx$ 1
4. $\int_3^8 \sqrt{x^3} dx$ 1
5. $\int_0^1 \frac{1}{\sqrt{1-x^2}} dx$ 1
6. $\int_0^1 \frac{1}{1+x^2} dx$ 1
7. $\int_0^{\pi/2} \frac{\sin x}{1+\cos^2 x} dx$ 1
8. $\int_0^{\pi/4} \sin^3 2t \cos 2t dt$ 1
9. $\int_0^{\pi/4} \tan x dx$ 1
10. $\int_{\pi/6}^{\pi/4} \cos x dx$ 1
11. $\int_0^1 x.e^{x^2} dx \rightarrow \int_0^1 x.e^{x^2} dx$ 1
12. $\int_2^3 \frac{1}{x} dx$ 1
13. $\int_{-\pi/2}^{\pi/2} \sin^7 x dx$ 1
14. $\int_1^2 \frac{\log x}{x} dx$ 1

15. $\int_0^1 \frac{1}{\sqrt[3]{x^2}} dx$ 1
16. $\int_0^1 \frac{\tan^{-1} x}{1+x^2} dx$ 1
17. $\int_0^4 (x+e^{2x}) dx$ 1
18. $\int_{\pi/4}^{\pi/2} \frac{1}{\tan x} dx$ 1
19. $\int_0^{\pi/4} (2 \sec^2 x + 1) dx$ 1
20. $\int_0^{\pi/4} \tan^2 x dx$

DEFINITE INTEGRATION 4 MARKS

1. Evaluate:- $\int_0^{\pi/2} \frac{\sin 2x}{\sin^4 x + \cos^4 x} dx$ 4
2. $\int_0^{\pi} \frac{dx}{s + 4 \cos x}$ 4
3. $\int_0^{\pi/2} \log \sin x dx$ 4
4. $\int_{-\pi/4}^{\pi/4} \sin^2 x dx$ 4
5. $\int_0^{\pi/4} \log(1 + \tan x) dx$ 4
6. $\int_e^{e^2} \left\{ \frac{1}{\log x} - \frac{1}{(\log x)^2} \right\} dx$ 4
7. $\int_0^{\pi} \frac{x dx}{a^2 \cos^2 x + b^2 \sin^2 x}$ 4
8. $\int_0^2 |x^2 - 2x - 3| dx$ 4
9. Using the property $\int_0^a f(x) dx = \int_0^a f(a-x) dx$ 4

Evaluate $\int_0^{\pi/2} \frac{\sqrt{\tan x}}{\sqrt{\tan x + \sqrt{\cot x}}} dx$

10

$$\int_{\pi/6}^{\pi/3} \frac{dx}{1 + \sqrt{\tan x}}$$

11.

$$\int_4^5 \frac{x}{(x-1)(x-2)} dx$$

12.

Let $f(x) = \sin^3 x$ & $g(x) = \cos^2 x$

i. Check whether $f(x)$ is even or odd? 1

ii. Evaluate $\int_{-\pi/2}^{\pi/2} \sin^3 x dx$ 1½

iii. Evaluate $\int_{-\pi/2}^{\pi/2} \cos^2 dx$ 1½

13.

$$\int_0^{\pi} \frac{x \sin x}{1 + \cos^2 x} dx$$

14.

Integrate as a limit of sum:-

$$\int_1^3 (x^2 + 2x) dx$$

15.

Given:-

$$|x| = \begin{cases} x, & \text{when } x \geq 0 \\ -x, & \text{when } x < 0 \end{cases}$$

Using above result

i. Find $|x+5|$ 1

ii. Evaluate $\int_{-5}^0 |x+5| dx$ 1

iii. Evaluate $\int_{-3}^{-5} |x+5| dx$ 1

iv. Evaluate $\int_{-3}^0 |x+5| dx$ 1

DEFINITE INTEGRAL 6 MARKS

1. a. Draw a rough sketch of $y = \cos x$ in $[0, \pi]$ 1

- b. Evaluate $\int_0^{\pi/2} |\cos x| dx$ 1
- c. Evaluate $\int_{\pi/2}^{\pi} |\cos x| dx$ 1
- d. Find the area of shaded region enclosed by the curve $y = \cos x$ and line $x=0, x=\pi$ and the x - axis 1
2. a. Sketch the graph of $y = |x+1|$ 2
- b. Evaluate $\int_{-1}^2 |x+1| dx$ 1½
- c. Evaluate $\int_{-3}^2 |x+1| dx$ 1½
- d. What does this value represent on the graph. 1
3. Find the area of the region.
 $\{(x, y) : 0 \leq yx^2 + 1, 0 \leq y \leq x+1, 0 \leq x \leq 2\}$
4. Evaluate $\int_1^4 (|x-1| + |x-2| + |x-3|) dx$
5. Evaluate $\int_{-1}^{3/2} |x \sin \eta x| dx$
6. Find the area of the region in the first quadrant enclosed by the x -axis, the line $y=x$ and the circle $x^2+y^2 = 32$.
7. Using the method of integration, find the area of the region bounded by the lines $2x+y=4, 3y-2x=6$ and $x-3y+5=0$
8. Using integration, find the area of the region bounded by the triangle. Whose vertices are (1,0), (2, 2) and (3, 1).
9. Find the area of the region enclosed between two circles $x^2+y^2 = 4$ and $(x-2)^2+y^2=4$
10. Find the area of the region enclosed between two curves $y^2=x$ and $x^2=y$