



INDEFINITE INTEGRATION

LONG ANSWER QUESTIONS (7 Marks)

- ***1. Evaluate $\int \frac{9 \cos x - \sin x}{4 \sin x + 5 \cos x} dx$ (Mar-2008)
- ***2. Evaluate $\int \frac{2 \cos x + 3 \sin x}{4 \cos x + 5 \sin x} dx$ (May-08,16 T.S,Mar-15AP)
- ***3. Evaluate $\int \frac{2 \sin x + 3 \cos x + 4}{3 \sin x + 4 \cos x + 5} dx$ (Mar-11,14,Mar-16.AP&TS)
- ***4. Evaluate $\int \frac{\cos x + 3 \sin x + 7}{\cos x + \sin x + 1} dx$ (June-06)
- ***5. Find the reduction formula for $\int \sin^n x dx (n \geq 2)$ and hence find $\int \sin^4 x dx$ (May-09,10 Mar-13,14)
- ***6. Find the reduction formula for $\int \tan^n x dx (n \geq 2)$ and hence find $\int \tan^6 x dx$ (Mar-07,12,15 A.P,May-16AP)
- ***7. Obtain reduction formula for $I_n = \int \cot^n x dx, n$ being a positive integer $n \geq 2$ and hence deduce the value of $\int \cot^4 x dx$ (Mar-16,A.P)(May-11)
- ***8. Obtain reduction formula for $I_n = \int \sec^n x dx, n$ being a positive integer $n \geq 2$ and hence deduce the value of $\int \sec^5 x dx$
- ***9. If $I_n = \int \cos^n x dx$ then show that $I_n = \frac{1}{n} \cos^{n-1} x \sin x + \frac{n-1}{n} I_{n-2}$ (May-02,16,T.S)
- ***10. Obtain the reduction formula for $I_n = \int \operatorname{Cosec}^n x dx, n$ being a positive integer, $n \geq 2$ and hence deduce the value of $\int \operatorname{Cosec}^5 x dx$. (Mar-16 T.S)
- ***11. Evaluate $\int (6x+5)\sqrt{6-2x^2+x} dx$ (Mar-09,May-06)
- ***12. Evaluate $\int (3x-2)\sqrt{2x^2-x+1} dx$
- ***13. Evaluate $\int \frac{2x+5}{\sqrt{x^2-2x+10}} dx$ (Mar-06,15 T.S)

***14. Evaluate $\int \frac{x+5}{\sqrt{x^2-x+1}} dx$ (May-07)

***15. Evaluate $\int \frac{x+1}{\sqrt{x^2+3x+12}} dx$ (Mar-10) (May-16A.P)

***16. Evaluate $\int \frac{1}{(1+x)\sqrt{3+2x-x^2}} dx$ (June-05)

***17. Evaluate $\int \frac{dx}{(x+1)\sqrt{2x^2+3x+1}}$ (May-14)

***18. Evaluate $\int \frac{dx}{(1+x)\sqrt{3-2x-x^2}}$ on $(-1,3)$

***19. Evaluate $\int \sqrt{\frac{5-x}{x-2}} dx$ on $(2,5)$ (Mar-02,04)

***20. Evaluate $\int \frac{x+3}{(x-1)(x^2+1)} dx$ (May-07)

***21. Evaluate $\int \frac{dx}{3\cos x + 4\sin x + 6}$ (Mar-13)

***22. Show that $\int \sqrt{a^2-x^2} dx = \frac{x}{2}\sqrt{a^2-x^2} + \frac{a^2}{2}\sin^{-1}\left(\frac{x}{a}\right) + c$ (Mar-02)

**23. Evaluate $\int \frac{dx}{5+4\cos x}$ (Mar-08,10)

**24. Evaluate $\int \frac{1}{4+5\sin x} dx$ (Mar-05)

**25. Evaluate $\int \frac{dx}{5+4\cos 2x}$ (Mar-11)

**26. Evaluate $\int \frac{dx}{2-3\cos 2x}$ (June10)

**27. Evaluate $\int \frac{2x+3}{(x+3)(x^2+4)} dx$

**28. Evaluate $\int \frac{dx}{1+x^4}$ on R

- *29. If $I_{m,n} = \int \sin^m x \cos^n x dx$ then show that $I_{m,n} = \frac{-\sin^{m-1} x \cos^{n+1} x}{m+n} + \frac{m-1}{m+n} I_{m-2,n}$, for a positive integer n and an integer $m \geq 2$.
- *30. Evaluate $\int x \sin^{-1} x dx$ on $(-1,1)$
- *31. Evaluate $\int x^2 \cos x dx$
- *32. Evaluate $\int \tan^{-1} \sqrt{\frac{1-x}{1+x}} dx$, on $(-1,1)$
- *33. Evaluate $\int \frac{1}{x^3+1} dx$
- *34. Evaluate $\int \frac{1}{\sin x + \sqrt{3} \cos x} dx$ (May-12)
- *35. Evaluate $\int \frac{2x^2 + x + 1}{(x+3)(x-2)^2} dx$
- *36. Evaluate $\int x \sqrt{1+x-x^2} dx$ (May-12)

VERY SHORT ANSWER QUESTIONS

1. Evaluate $\int \left(x + \frac{1}{x}\right)^3 dx, x > 0$ (May-12)
2. Evaluate $\int \frac{(a^x - b^x)^2}{a^x b^x} dx$
3. Evaluate $\int \sqrt{1 - \cos 2x} dx$ (May-06, Mar-09)
4. Evaluate $\int \sec^2 x \cos ec^2 x dx$ (May-07,09) (Mar-16 T.S)
5. Evaluate $\int \left(\frac{1}{\sqrt{1-x^2}} + \frac{2}{\sqrt{1+x^2}}\right) dx$ on $(-1,1)$ (May-11)
6. Evaluate $\int \frac{dx}{\cosh x + \sinh x}$ on R (Mar-15 A.P) (Mar-16 T.S)
7. Evaluate $\int \frac{\sin(\tan^{-1} x)}{1+x^2} dx, x \in R$ (Mar-15 A.P)
8. Evaluate $\int e^x [\tan x + \log(\sec x)] dx$ (Mar-07, Mar-08)

9. Evaluate $\int e^x (1 + \tan^2 x + \tan x) dx$ (Mar-06)
10. Evaluate $\int e^x (\sec x + \sec x \tan x) dx$ (Mar-16 A.P)
11. Evaluate $\int e^x \frac{(1+x \log x)}{x} dx$ (May-08 Mar-13,15-A.P)
12. Evaluate $\int \frac{e^x (1+x)}{(2+x)^2} dx$ (May-09)
13. Evaluate $\int \frac{xe^x}{(x+1)^2} dx$
14. Evaluate $\int \frac{1}{(x+1)(x+2)} dx$ (May-11,Mar-12,Mar-14)
15. Evaluate $\int \frac{dx}{(x+3)\sqrt{x+2}}$ (May-12,Mar14)
16. Evaluate $\int \frac{dx}{(x+5)\sqrt{x+4}}$
17. Evaluate $\int \left(1 - \frac{1}{x^2}\right) e^{\left(x+\frac{1}{x}\right)} dx$
18. Evaluate $\int \frac{e^x (1+x)}{\cos^2(xe^x)} dx$ on $I \subset \mathbb{R} \setminus \{x \in \mathbb{R} : \cos(xe^x) = 0\}$ (Mar-10,May-10,16 T.S)
19. Evaluate $\int \frac{x^8}{1+x^{18}} dx$ on \mathbb{R} (Mar-09,16 A.P)
20. Evaluate $\int \frac{2x^3}{1+x^8} dx$ (May-08)
21. Evaluate $\int \frac{x^2 dx}{\sqrt{1-x^6}}$ (June-05)
22. Evaluate $\int \frac{\sin^4 x}{\cos^6 x} dx$
23. Evaluate $\int \frac{\cot(\log x)}{x} dx$
24. Evaluate $\int \frac{\cos \sqrt{x}}{x} dx$ (June-10)

25. Evaluate $\int \sec x \log(\sec x + \tan x).dx$
26. Evaluate $\int \frac{1}{x \log x [\log(\log x)]} dx$ (Mar 2011)
27. Evaluate $\int \frac{1}{e^x - 1} dx$
28. Evaluate $\int \frac{1 + \cos^2 x}{1 - \cos 2x} dx$ (Mar-13)
29. Evaluate $\int \log x dx$ (June-10)
30. Evaluate $\int x \tan^{-1} x .dx$
31. Evaluate $\int \sin^{-1} x dx$ (Mar-05)
32. Evaluate $\int \frac{dx}{\sqrt{x^2 + 2x + 10}} dx$ (June-05)
33. Evaluate $\int \frac{\sin 2x}{a \cos^2 + b \sin^2 x} dx$ (Mar-06)
34. Evaluate $\int e^x \left(\frac{1 - \sin x}{1 - \cos x} \right) dx$
35. Evaluate $\int \frac{\cos x}{\sin^2 x + 4 \sin x + 5} dx$ (Mar-04)
36. Evaluate $\int \sqrt{16 - 25x^2} dx$ on $\left(\frac{-4}{5}, \frac{4}{5} \right)$
37. Evaluate $\int \frac{\text{Log}(1+x)}{1+x} dx$ on $(-1, \infty)$ (Mar-15 T.S)
38. Evaluate $\int \frac{1}{1 + \cos x} dx$ on $I \subset \mathbb{R} - \{(2n+1)\pi : n \in \mathbb{Z}\}$. (Mar-15 T.S)
39. Evaluate $\int \sqrt{x} \log x dx$ on $(0, \infty)$ (Mar-16 T.S)

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