1. $\int \frac{dx}{\cos x + \sqrt{3}\sin x}$ equals- **[AIEEE-2007]**

(1) $\frac{1}{2}\log\tan\left(\frac{x}{2}+\frac{\pi}{12}\right)+C$

(2) $\frac{1}{2}\log\tan\left(\frac{x}{2}-\frac{\pi}{12}\right)+C$

(3) $\log\tan\left(\frac{x}{2}+\frac{\pi}{12}\right)+C$

(4) $\log\tan\left(\frac{x}{2}-\frac{\pi}{12}\right)+C$

2. The value of $\sqrt{2}\int \frac{\sin x\, dx}{\sin\left(x-\frac{\pi}{4}\right)}$ is- **[AIEEE-2008]**

(1) $x + \log\left|\cos\left(x-\frac{\pi}{4}\right)\right| + c$

(2) $x - \log\left|\sin\left(x-\frac{\pi}{4}\right)\right| + c$

(3) $x + \log\left|\sin\left(x-\frac{\pi}{4}\right)\right| + c$

(4) $x - \log\left|\cos\left(x-\frac{\pi}{4}\right)\right| + c$

3. If the integral $\int \frac{5\tan x}{\tan x - 2}dx = x + a\ln|\sin x - 2\cos x| + k$ then a is equal to : **[AIEEE-2012]**

(1) 2 (2) –1

(3) –2 (4) 1

4. If $\int f(x)dx = \Psi(x)$, then $\int x^5 f(x^3)dx$ is equal to: **[JEE(Main)-2013]**

(1) $\frac{1}{3}\left[x^3\Psi(x^3) - \int x^2\Psi(x^3)dx\right]+C$

(2) $\frac{1}{3}x^3\Psi(x^3) - 3\int x^3\Psi(x^3)dx + C$

(3) $\frac{1}{3}x^3\Psi(x^3) - \int x^2\Psi(x^3)dx + C$

(4) $\frac{1}{3}\left[x^3\Psi(x^3) - \int x^3\Psi(x^3)dx\right]+C$

5. The integral $\int\left(1+x-\frac{1}{x}\right)e^{x+\frac{1}{x}}dx$ is equal to : **[JEE(Main)-2014]**

(1) $(x-1)e^{x+\frac{1}{x}}+c$ (2) $xe^{x+\frac{1}{x}}+c$

(3) $(x+1)e^{x+\frac{1}{x}}+c$ (4) $-xe^{x+\frac{1}{x}}+c$

6. The integral $\int \frac{dx}{x^2(x^4+1)^{\frac{3}{4}}}$ equals : **[JEE(Main)-2015]**

(1) $-(x^4+1)^{\frac{1}{4}}+c$ (2) $-\left(\frac{x^4+1}{x^4}\right)^{\frac{1}{4}}+c$

(3) $\left(\frac{x^4+1}{x^4}\right)^{\frac{1}{4}}+c$ (4) $(x^4+1)^{\frac{1}{4}}+c$

7. The integral $\int \frac{2x^{12}+5x^9}{(x^5+x^3+1)^3}dx$ is equal to :- **[JEE(Main)-2016]**

(1) $\frac{-x^{10}}{2(x^5+x^3+1)^2}+C$

(2) $\frac{-x^5}{(x^5+x^3+1)^2}+C$

(3) $\frac{x^{10}}{2(x^5+x^3+1)^2}+C$

(4) $\frac{x^5}{2(x^5+x^3+1)^2}+C$

where C is an arbitrary constant.

8. Let $I_n = \int \tan^n x\,dx, (n>1)$. $I_4 + I_6 = a\tan^5 x + bx^5 + C$, where C is a constant of integration, then the ordered pair (a, b) is equal to :- **[JEE(Main)-2017]**

(1) $\left(-\frac{1}{5},0\right)$ (2) $\left(-\frac{1}{5},1\right)$

(3) $\left(\frac{1}{5},0\right)$ (4) $\left(\frac{1}{5},-1\right)$

9. The integral **[JEE(Main)-2018]**

$$\int \frac{\sin^2 x \cos^2 x}{(\sin^5 x + \cos^3 x \sin^2 x + \sin^3 x \cos^2 x + \cos^5 x)^2} dx$$ is equal to

(1) $\frac{-1}{3(1+\tan^3 x)} + C$ (2) $\frac{1}{1+\cot^3 x} + C$

(3) $\frac{-1}{1+\cot^3 x} + C$ (4) $\frac{1}{3(1+\tan^3 x)} + C$

(where C is a constant of integration)

10. $\int \frac{x^2-1}{x^3\sqrt{2x^4-2x^2+1}} dx$ is equal to- **[IIT-2006]**

(1) $\frac{\sqrt{2x^4-2x^2+1}}{2x^2} + C$

(2) $\frac{\sqrt{2x^4-2x^2+1}}{x^3} + C$

(3) $\frac{\sqrt{2x^4-2x^2+1}}{x^2} + C$

(4) $\frac{\sqrt{2x^4-2x^2+1}}{x} + C$

11. Let $f(x) = \frac{x}{(1+x^n)^{1/n}}$ for $n \ge 2$ and $g(x) = \underbrace{fofo....of}_{f \text{ occus n times}}(x)$. Then $\int x^{n-2} g(x)\, dx$ equals- **[IIT-2007]**

(1) $\frac{1}{n(n-1)} (1+nx^n)^{1-\frac{1}{n}} + K$

(2) $\frac{1}{n-1} (1+nx^n)^{1-\frac{1}{n}} + K$

(3) $\frac{1}{n(n+1)} (1+nx^n)^{1+\frac{1}{n}} + K$

(4) $\frac{1}{n+1} (1+nx^n)^{1+\frac{1}{n}} + K$

12. Let $I = \int \frac{e^x}{e^{4x}+e^{2x}+1} dx$, $J = \int \frac{e^{-x}}{e^{-4x}+e^{-2x}+1} dx$.

Then, for an arbitrary constant C, the value of J – I equals- **[IIT-2008]**

(1) $\frac{1}{2}\log\left(\frac{e^{4x}-e^{2x}+1}{e^{4x}+e^{2x}+1}\right) + C$

(2) $\frac{1}{2}\log\left(\frac{e^{2x}+e^{x}+1}{e^{2x}-e^{x}+1}\right) + C$

(3) $\frac{1}{2}\log\left(\frac{e^{2x}-e^{x}+1}{e^{2x}+e^{x}+1}\right) + C$

(4) $\frac{1}{2}\log\left(\frac{e^{4x}+e^{2x}+1}{e^{4x}-e^{2x}+1}\right) + C$

13. The integral $\int \frac{\sec^2 x}{(\sec x + \tan x)^{9/2}} dx$ equals (for some arbitrary constant K) **[IIT-2012]**

(1) $-\frac{1}{(\sec x+\tan x)^{11/2}}\left\{\frac{1}{11} - \frac{1}{7}(\sec x + \tan x)^2\right\} + K$

(2) $\frac{1}{(\sec x+\tan x)^{11/2}}\left\{\frac{1}{11} - \frac{1}{7}(\sec x + \tan x)^2\right\} + K$

(3) $-\frac{1}{(\sec x+\tan x)^{11/2}}\left\{\frac{1}{11} + \frac{1}{7}(\sec x + \tan x)^2\right\} + K$

(4) $\frac{1}{(\sec x+\tan x)^{11/2}}\left\{\frac{1}{11} + \frac{1}{7}(\sec x + \tan x)^2\right\} + K$

PREVIOUS YEARS QUESTIONS				ANSWER KEY					Exercise-II
Que.	1	2	3	4	5	6	7	8	9	10
Ans.	**1**	**3**	**1**	**3**	**2**	**2**	**3**	**3**	**1**	**1**
Que.	11	12	13							
Ans.	**1**	**3**	**3**							