INDEFINITE INTEGRATION

PREVIOUS EAMCET BITS

1. $\int \frac{dx}{(x+1)\sqrt{4x+3}}$ **[EAMCET 2009]**

1) $\tan^{-1}\sqrt{4x+3}+c$ 2) $3\tan^{-1}\sqrt{4x+3}+c$ 3) $2\tan^{-1}\sqrt{4x+3}+c$ 4) $4\tan^{-1}\sqrt{4x+3}+c$

Ans:

Sol: $4x+3=t^2$ $\quad x=\frac{t^2-3}{4}$ $\quad =\int \frac{\frac{1}{2}tdt}{\left(\frac{t^2-3}{4}+1\right)t}$

$4dx=2tdt$ $\quad =\int \frac{2}{t^2+t}dt = 2\tan^{-1}t+c = 2\tan^{-1}\left(\sqrt{4x+3}\right)+c$

$dx=\frac{1}{2}tdt$

2. $\int\left(\frac{2-\sin 2x}{1-\cos 2x}\right)e^x dx$ **[EAMCET 2009]**

1) $-e^x\cot x+c$ 2) $e^x\cot x+c$ 3) $2e^x\cot x+c$ 4) $-2e^x\cot x+c$

Ans: 1

Sol: $\int\left(\frac{2-2\sin x\cos x}{2\sin^2 x}\right)e^x dx=\int\left(\operatorname{cosec}^2 x-\cot x\right)e^x dx$

$=\int e^x\left[\left(-\cot x\right)+\operatorname{cosec}^2 x\right]dx$

$e^x\left(-\cot x\right)+c \quad \left[\because \int e^x\left[f(x)+f'(x)\right]dx=e^x f(x)+c\right]$

3. If $I_n=\int \sin^n x dx$ then $nI_n-(n-1)I_{n-2}=$ **[EAMCET 2009]**

1) $\sin^{n-1}x\cos x$ 2) $\cos^{n-1}x\sin x$ 3) $-\sin^{n-1}x\cos x$ 4) $-\cos^{n-1}x\sin x$

Ans: 1

Sol: $I_n=\int \underset{u}{\sin^{n-1}x}\,\underset{v}{\sin x}\,dx$

$I_n=\sin^{n-1}x\left(-\cos x\right)-\int(n-1)(\sin x)^{n-2}(\cos x)(-\cos x)dx$

$I_n=-\sin^{n-1}x\cos x+(n-1)\int(\sin x)^{n-2}\left(1-\sin^2 x\right)dx$

$I_n=-\sin^{n-1}x\cos x+(n-1)\int \sin^{n-2}xdx-(n-1)\int \sin^n xdx$

$I_n=-\sin^{n-1}x\cos x+(n-1)I_{n-2}-(n-1)I_n \Rightarrow nI_n-(n-1)I_{n-2}=\sin^{n-1}x\cos x$

4. If $\int e^x\left(\frac{1-\sin x}{1-\cos x}\right)dx = f(x)+c$ then $f(x) =$ **[EAMCET 2008]**

1) $e^x\cot\left(\frac{x}{2}\right)$ 2) $e^{-x}\cot\left(\frac{x}{2}\right)$ 3) $-e^x\cot\left(\frac{x}{2}\right)$ 4) $-e^{-x}\cot\left(\frac{x}{2}\right)$

Ans:3

Sol: $\int e^x\left(\frac{1-2\sin\frac{x}{2}\cos\frac{x}{2}}{2\sin^2\frac{x}{2}}\right)dx = \int e^x\left[\frac{1}{2}\operatorname{cosec}^2\frac{x}{2}-\cot\frac{x}{2}\right]dx$

$= e^x\left(-\cot\frac{x}{2}\right)+c \quad \left[\because \int e^x\left[f(x)+f'(x)\right]dx = e^x f(x)+c\right]$

$\therefore f(x) = -e^x\cot\frac{x}{2}$

5. If $I_n = \int x^n e^{cx}dx$ for $n \geq 1$ then $c.I_n + n.I_{n-1} =$ **[EAMCET 2008]**

1) $x^n e^{cx}$ 2) x^n 3) e^{cx} 4) $x^n + e^{cx}$

Ans: 1

Sol: $I_n = \int \frac{x^n}{u}.\frac{e^{cx}}{v}dx$

$x^n\int e^{cx}dx - \int n.x^{n-1}.\left(\frac{e^{cx}}{c}\right)dx$

$I_n = x^n\left(\frac{e^{cx}}{c}\right) - \frac{n}{c}I_{n-1} \Rightarrow CI_n = x^n e^{cx} - nI_{n-1}$

$C.I_n + nI_{n-1} = x^n e^{cx}$

6. If $\int e^x(1+x).\sec^2(xe^x)dx = f(x)+c$ then $f(x) =$ **[EAMCET 2008]**

1) $\cos(xe^x)$ 2) $\sin(xe^x)$ 3) $2\tan^{-1}x$ 4) $\tan(xe^x)$

Ans:

Sol: Let $xe^x = t$

$(x.e^x + e^x.1)dx = dt$

$e^x(x+1)dx = dt$

$\int e^x(x+1)\sec^2(xe^x)dx = \int \sec^2 \tan$

$= \tan t + c \Rightarrow \tan(xe^x)+c$

$\therefore f(x) = \tan(xe^x)$

7. $I\int \frac{e^x-1}{e^x+1}dx = f(x)+c$ then f(x) is equal to **[EAMCET 2007]**

1) $2\log\left(e^x+1\right)$ 2) $\log\left(e^{2x}-1\right)$ 3) $2\log\left(e^x+1\right)-x$ 4) $\log\left(e^{2x}+1\right)$

Ans: 3

Sol: $=\int\frac{e^x+e^x-e^x-1}{e^x+1}dx\Rightarrow\int\frac{2e^x-\left(e^x+1\right)}{e^x+1}dx$

$=\int\frac{2e^x}{e^x+1}dx-\int\frac{e^x+1}{e^x+1}dx=2\int\frac{e^x}{e^x+1}dx-\int 1dx$

$=2\log\left|e^x+1\right|-x+c$

$\therefore f\left(x\right)=2\log\left(e^x+1\right)-x$

8. $\int\tan^{-1}\left(\sqrt{\frac{1-x}{1+x}}\right)dx=$ **[EAMCET 2007]**

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

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

Ans:

Sol: Put x = cos2θ

$=\int\tan^{-1}\left(\sqrt{\frac{1-\cos 2\theta}{1+\cos 2\theta}}\right)dx$

$=\int\tan^{-1}\left(\sqrt{\tan^2\theta}\right)dx$

$=\int\theta dx=\int\frac{1}{2}\cos^{-1}x dx$

$=\frac{1}{2}\int\cos^{-1}x.1.dx$

$=\frac{1}{2}\left[\cos^{-1}x.x-\int\frac{-1}{\sqrt{1-x^2}}.xdx\right]$

$=\frac{1}{2}\left[\cos^{-1}x.x-\frac{1}{2}\int\frac{-2x}{\sqrt{1-x^2}}dx\right]$

$=\frac{1}{2}\left[\cos^{-1}x.x-\frac{1}{2}\times 2\sqrt{1-x^2}\right]+c$

$=\frac{1}{2}\left[\cos^{-1}x.x-\sqrt{1-x^2}\right]+c$

9. $\int\frac{\sin x+8\cos x}{4\sin x+6\cos x}dx$ **[EAMCET 2007]**

1) $x+\frac{1}{2}\log\left|4\sin x+6\cos x\right|+c$ 2) $2x+\log\left|2\sin x+3\cos x\right|+c$

3) $x+2\log\left|2\sin x+3\cos x\right|+c$ 4) $\frac{1}{2}\log\left|4\sin x+6\cos x\right|+c$

Ans: 1

Sol: $\int\frac{a\cos x+b\sin x}{c\cos x+d\sin x}dx=\left(\frac{ac+bd}{c^2+d^2}\right)x+\left(\frac{ad-bc}{c^2+d^2}\right)\log\left|\left(\cos x+d\sin x\right)\right|+c$

$$\int \frac{8\cos x + 1.\sin x}{6\cos x + 4\sin x}dx = \left(\frac{48+4}{36+16}\right)x + \left(\frac{32-6}{36+16}\right)\log\left|6\cos x + 4\sin x\right| + c$$

$$= x + \frac{1}{2}\log\left|6\cos x + 4\sin x\right| + c$$

10. If $\int \sqrt{\frac{x}{a^3 - x^3}}\,dx = g(x) + c$ then g(x) is equal to **[EAMCET 2006]**

1) $\frac{2}{3}\cos^{-1} x$ 2) $\frac{2}{3}\sin^{-1}\left(\frac{x^3}{a^3}\right)$ 3) $\frac{2}{3}\sin^{-1}\left(\sqrt{\frac{x^3}{a^3}}\right)$ 4) $\frac{2}{3}\cos^{-1}\left(\frac{x}{a}\right)$

Ans:

Sol: $\int \sqrt{\frac{x}{a^3\left(1 - \frac{x^3}{a^3}\right)}}\,dx = \frac{1}{a}\int \frac{\sqrt{x/a}}{\sqrt{1 - \left(\frac{x}{a}\right)^3}}dx$ Let $\frac{x}{a} = \sin^{2/3}\theta$

$= \frac{1}{a}\int \frac{(\sin\theta)^{1/3}}{\sqrt{1 - \sin^2\theta}} \times \frac{2a}{3} \times \frac{\cos\theta}{(\sin\theta)^{1/3}}d\theta$ $dx = a.\frac{2}{3}(\sin\theta)^{\frac{2}{3}-1}\cos\theta d\theta$

$= \frac{2}{3}\int 1.d\theta \Rightarrow \frac{2}{3}\theta + c$ $dx = \frac{2a}{3} \times \frac{\cos\theta}{(\sin\theta)^{1/3}}d\theta$

$= \frac{2}{3}\sin^{-1}\left(\sqrt{\frac{x^3}{a^3}}\right) + c$

$\therefore g(x) = \frac{2}{3}\sin^{-1}\left(\sqrt{\frac{x^3}{a^3}}\right) + c$

11. If $\int \frac{dx}{x^2 + 2x + 2} = f(x) + c$ then f(x) is equal to **[EAMCET 2006]**

1) $\tan^{-1}(x+1)$ 2) $2\tan^{-1}(x+1)$ 3) $-\tan^{-1}(x+1)$ 4) $3\tan^{-1}(x+1)$

Ans: 1

Sol: $\int \frac{dx}{(x+1)^2 + 1} = \tan^{-1}(x+1)c$

$\therefore f(x) = \tan^{-1}(x+1)$

12. Observe the following statements : **[EAMCET 2006]**

A : $\int \left(\frac{x^2+1}{x^2}\right)e^{\frac{x^2-1}{x}}dx = e^{\frac{x^2-1}{x}} + c$

R : $\int f^1(x).e^{f(x)}dx = f(x) + c$, then which of the following is true ?

1) Both A and R are true and R is the correct reason of A

2) Both A and R are true and R is the correct reason of A

3) A is true, R is false 4) A is false, R is true

Ans: 3

Sol: R : $\int f^1(x).e^{f(x)}dx$ A : $\int\left(1+\frac{1}{x^2}\right)e^{\left(x-\frac{1}{x}\right)}dx$

Let f(x) = t Let $x-\frac{1}{x}=t$

$\int f^1(x)dn = dt$ $\left(1+\frac{1}{x^2}\right)dx = dt$

$\int e^t dt = e^t + c$ $\int e^t dt = e^t + c = e^{x-\frac{1}{x}} + c$

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

Here A is true and R is false

13. If $\int \frac{\sin x}{\cos x(1+\cos x)}dx = f(x)+c$ **[EAMCET 2005]**

1) $\log\left|\frac{1+\cos x}{\cos x}\right|$ 2) $\log\left|\frac{\cos x}{1+\cos x}\right|$ 3) $\log\left|\frac{\sin x}{1+\sin x}\right|$ 4) $\log\left|\frac{1+\sin x}{\sin x}\right|$

Ans: 1

Sol: Let cosx = t

– sinxdx = dt

$\int \frac{-dt}{t(1+t)} = \int\left(\frac{-1}{t}+\frac{1}{t+1}\right)dt$

$= -\log t + \log|t+1| + c$

$= \log\left|\frac{t+1}{t}\right| + c = \log\left|\frac{1+\cos x}{\cos x}\right| + c$

$\therefore f(x) = \log\left|\frac{1+\cos x}{\cos x}\right| + c$

14. $\int \frac{x^{49}\tan^{-1}(x^{50})}{1+x^{100}}dx = K\left[\tan^{-1}(x^{50})\right]^2 + c$, then K = **[EAMCET 2005]**

1) $\frac{1}{50}$ 2) $-\frac{1}{50}$ 3) $\frac{1}{100}$ 4) $-\frac{1}{100}$

Ans:

Sol: Let $\tan^{-1}(x^{50}) = t$

$$\frac{1}{1+\left(x^{50}\right)^2}\times 50.x^{49}dx = dt$$

$$= \frac{x^{49}dx}{1+x^{100}} = \frac{dt}{50} = \int t\frac{dt}{50} = \frac{1}{50}\times\frac{t^2}{2}+c \Rightarrow \frac{1}{100}\left[\tan^{-1}50\right]^2+c$$

15. If $\int \sin^{-1}\left(\frac{2x}{1+x^2}\right)dx = f\left(x\right)-\log\left|1+x^2\right|+c$ then f(x) = **[EAMCET 2005]**

1) $2x\tan^{-1}x$ 2) $-2x\tan^{-1}x$ 3) $x\tan^{-1}x$ 4) $-x\tan^{-1}x$

Ans: 1

Sol: $\int \sin^{-1}\left(\frac{2x}{1+x^2}\right)dx = \int 2\tan^{-1}x dx$

$$= 2\int \tan^{-1}x.1.dx$$

$$= 2\left[\tan^{-1}x.\int 1.dx - \int \frac{1}{1+x^2}.xdx\right]$$

$$= 2x\tan^{-1}x - \log\left|1+x^2\right|+c$$

$$\therefore f\left(x\right) = 2x\tan^{-1}x$$

16. $\int \frac{dx}{\left(x+100\right)\sqrt{x+99}} = f\left(x\right)+c \Rightarrow f\left(x\right) =$ **[EAMCET 2004]**

1) $2\left(x+100\right)^{1/2}$ 2) $3\left(x+100\right)^{1/2}$ 3) $2\tan^{-1}\left(\sqrt{x+99}\right)$ 4) $2\tan^{-1}\left(\sqrt{x+100}\right)$

Ans: 3

Sol: Let x + 99 = t^2

dx = 2t dt

$$x+100 = \left(x+99\right)+1 \Rightarrow t^2+1$$

$$\int \frac{dx}{\left(x+100\right)\sqrt{x+99}} = \int \frac{2tdt}{\left(t^2+1\right)t} = 2\tan^{-1}\left(t\right)+c$$

$$= 2\tan^{-1}\left(\sqrt{x+99}\right)+c$$

$$\therefore f\left(x\right) = 2\tan^{-1}\left(\sqrt{x+99}\right)$$

17. $\int \frac{3-x^2}{1-2x+x^2}.e^x dx = e^x f\left(x\right)+c \Rightarrow f\left(x\right) =$ **[EAMCET 2004]**

1) $\frac{1+x}{1-x}$ 2) $\frac{1-x}{1+x}$ 3) $\frac{1+x}{x-1}$ 4) $\frac{x-1}{1+x}$

Ans:1

Sol: $= -\int \frac{x^2-3}{(x-1)^2}.e^x dx \Rightarrow -\int \frac{(x^2-1)-2}{(x-1)^2} e^x dx$

$= -\int \left[\frac{(x+1)(x-1)}{(x-1)^2} - \frac{2}{(x-1)^2}\right] e^x dx\, 4$

$= \int \left[\frac{x+1}{x-1} - \frac{2}{(x+1)^2}\right].e^x.dx \Rightarrow -e^x\left[\frac{x+1}{x-1}\right] + c$

$= e^x\left(\frac{x+1}{1-x}\right) + c \Rightarrow f(x) = \frac{1+x}{1-x}$

18. $\int \frac{\sqrt{\cot x}}{\sin x \cos x} dx = -f(x) + c \Rightarrow f(x) =$ **[EAMCET 2004]**

1) $2\sqrt{\tan x}$ 2) $-\ 2\sqrt{\tan x}$ 3) $-2\sqrt{\cot x}$ 4) $2\sqrt{\cot x}$

Ans: 4

Sol: $\int \frac{\sqrt{\cot x}}{\sin x \cos x} \times \frac{\operatorname{cosec}^2 x}{\operatorname{cosec}^2 x} dx = \int \frac{\sqrt{\cot x}.\operatorname{cosec}^2 x}{\cot x} dx$

$= -\int \frac{\operatorname{cosec}^2 x}{\sqrt{\cot x}} dx = -2\sqrt{\cot x} + c$

$\therefore f(x) = 2\sqrt{\cot x}$

19. $\int \frac{1+x+\sqrt{x+x^2}}{\sqrt{x}+\sqrt{1+x}} dx =$ **[EAMCET 2003]**

1) $\frac{1}{2}\sqrt{1+x} + c$ 2) $\frac{2}{3}(1+x)^{3/2} + c$ 3) $\sqrt{1+x} + c$ 4) $2(1+x)^{3/2} + c$

Ans:

Sol: $= \int \frac{\left(\sqrt{1+x}\right)^2 + \sqrt{x}.\sqrt{1+x}}{\sqrt{x}+\sqrt{1+x}} dx$

$= \int \frac{\sqrt{1+x}\left[\sqrt{1+x}+\sqrt{x}\right]}{\sqrt{x}+\sqrt{1+x}} dx$

$= \int \sqrt{1+x}\, dx = \frac{2(1+x)^{3/2}}{3} + c$

20. $\int \left(1+x-x^{-1}\right) e^{x+x^{-1}} dx =$ **[EAMCET 2003]**

1) $(1+x)e^{x+x^{-1}} + c$ 2) $(x-1)e^{x+x^{-1}} + c$ 3) $-xe^{x+x^{-1}} + c$ 4) $xe^{x+x^{-1}} + c$

Ans:

Sol: $\int\left(1-\frac{1}{x}+x\right)e^{x+\frac{1}{x}}dx=\int\left[\left(1-\frac{1}{x}\right)e^{x+\frac{1}{x}}+xe^{x+\frac{1}{x}}\right]dx$

Let $xe^{x+\frac{1}{x}}=t$

$\left[x.e^{x+\frac{1}{x}}\left(1-\frac{1}{x^2}\right)+e^{x+\frac{1}{x}}\right]dx=dt$

$e^{x+\frac{1}{x}}\left(x-\frac{1}{x}+1\right)dx=dt$

$=\int 1.dt = t+c$

$xe^{x+\frac{1}{x}}+c$

21. $\int\frac{dx}{1-\cos x-\sin x}=$ **[EAMCET 2002]**

1) $\log\left|1+\cot\frac{x}{2}\right|+c$ 2) $\log\left|1-\tan\frac{x}{2}\right|+c$ 3) $\log\left|1-\cot\frac{x}{2}\right|+c$ 4) $\log\left|1+\tan\frac{x}{2}\right|+c$

Ans: 3

Sol: $\int\frac{dx}{1-\cos x-\sin x}$

$=\int\frac{dx}{2\sin^2 x/2-2\sin x/2\cos x/2}=\int\frac{dx}{2\sin^2\frac{x}{2}\left[1-\cot\frac{x}{2}\right]}$

$=\int\frac{\frac{1}{2}\operatorname{cosec}^2\frac{x}{2}dx}{1-\cot\frac{x}{2}}=\log\left|1-\cot\frac{x}{2}\right|+c$

22. $\int\frac{dx}{7+5\cos x}=$ **[EAMCET 2002]**

1) $\frac{1}{\sqrt{3}}\tan^{-1}\left(\frac{1}{\sqrt{3}}\tan\frac{x}{2}\right)+c$ 2) $\frac{1}{\sqrt{6}}\tan^{-1}\left(\frac{1}{\sqrt{6}}\tan\frac{x}{2}\right)+c$

3) $\frac{1}{7}\tan^{-1}\left(\tan\frac{x}{2}\right)+c$ 4) $\frac{1}{4}\tan^{-1}\left(\tan\frac{x}{2}\right)+c$

Ans: 2

Sol: $\int\frac{dx}{7+5\cos x}$

use $\cos x = \dfrac{1-\tan^2\frac{x}{2}}{1+\tan^2\frac{x}{2}}$

$$\int \frac{\sec^2.\frac{x}{2}dx}{12+2\tan^2\frac{x}{2}} = \frac{1}{2}\int \frac{\sec^2\frac{x}{2}dx}{\left(\sqrt{6}\right)^2+\tan^2\frac{x}{2}}$$

Put tanx/2 = t

$$= \frac{1}{\sqrt{6}}\tan^{-1}\left(\frac{1}{\sqrt{6}}\tan\frac{x}{2}\right)+C$$

23. $\int \frac{3^x}{\sqrt{9^x-1}}dx =$ **[EAMCET 2002]**

1) $\frac{1}{\log_3}\log\left|3^x+\sqrt{9^x-1}\right|+c$ 2) $\frac{1}{\log_3}\log\left|3^x-\sqrt{9^x-1}\right|+c$

3) $\frac{1}{\log_9}\log\left|3^x-\sqrt{9^x-1}\right|+c$ 4) $\frac{1}{\log_3}\log\left|9^x+\sqrt{9^x-1}\right|+c$

Ans: 1

Sol: $\int \frac{3^x}{\sqrt{9^x-1}}dx$

$3^x = t \Rightarrow 3x\log 3dx = dt$

$$\frac{1}{\log 3}\int\frac{dt}{\sqrt{t^2-1}} = \frac{1}{(\log 3)}\log\left|3^x+\sqrt{9^x-1}\right|+C$$

24. $\int \frac{dx}{\sqrt{x}(x+9)} =$ **[EAMCET 2001]**

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

Ans: 2

Sol: $\int \frac{dx}{\sqrt{x}(x+9)}$

Let x = t^2 , dx = 2tdt

$$\Rightarrow \int \frac{2tdt}{t\left(t^2+9\right)}$$

$$= 2\int\frac{dt}{t^2+3^2} = \frac{2}{3}\tan^{-1}\left(\frac{t}{3}\right)+C$$

$= \frac{2}{3}\tan^{-1}\left(\frac{\sqrt{x}}{3}\right) + C$

25. $\int (x+1)^2 e^x dx =$ **[EAMCET 2001]**

1) $xe^x + c$ 2) $x^2e^x + c$ 3) $(x+1)e^x + c$ 4) $(x^2+1)e^x + c$

Ans: 4

Sol: $\int (x+1)^2 e^x dx$

$\int (x^2+1+2x).e^x dx$

Let $f(x) = x^2 + 1 \Rightarrow f'(x) = 2x$

$\int [f(x) + f'(x)]e^x dx = f(x).e^x + c$

$= (x^2+1)e^x + c$

26. $\int \frac{dx}{a^2\sin^2 x + b^2\cos^2 x} =$ **[EAMCET 2001]**

1) $\frac{1}{ab}\tan^{-1}\left(\frac{a\tan x}{b}\right) + c$ 2) $\tan^{-1}\left(\frac{a\tan x}{b}\right) + c$

3) $\frac{1}{ab}\tan^{-1}\left(\frac{b\tan x}{a}\right) + c$ 4) $\tan^{-1}\left(\frac{b\tan x}{a}\right) + c$

Ans: 1

Sol: $\int \frac{dx}{a^2\sin^2 x + b^2\cos^2 x} = \int \frac{\sec^2 x dx}{a^2\sin^2 x \sec^2 x + b^2\cos^2 x \sec^2 x} \Rightarrow \int \frac{\sec^2 x}{a^2\tan^2 x + b^2} dx$

$= \frac{1}{ab}\tan^{-1}\left(\frac{a\tan x}{b}\right) + C$

27. $\int e^x (1 - \cot x + \cot^2 x) dx =$ **[EAMCET 2000]**

1) $e^x \cot x + c$ 2) $-e^x \cot x + c$ 3) $e^x \operatorname{cosec} + c$ 4) $-e^x \operatorname{cosec} + c$

Ans: 2

Sol: $\int e^x (1 - \cot x + \cot^2 x) dx$

$= \int e^x (-\cot x + \operatorname{cosec} x^2) dx$

Let $f(x) = -\cot x \Rightarrow f'(x) = \operatorname{cosec}^2 x$

$\Rightarrow \int e^x [f(x) + f'(x)] dx = e^x f(x) + c$

$= -e^x \cot x + c$

28. $\int \frac{\sin^6 x}{\cos^8 x} dx =$ **[EAMCET 2000]**

1) $\tan 7x + c$ 2) $\frac{\tan^7 x}{7} + c$ 3) $\frac{\tan 7x}{7} + c$ 4) $\sec^7 x + c$

Ans: 2

Sol: $\int \frac{\sin^6 x}{\cos^8 x} dx = \int \tan^6 x \sec^2 x dx = \frac{\tan^7 x}{7} + c \left[\because \int f(x)^n f'(x) dx = \frac{[f(x)]^{n+1}}{n+1} \right]$

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