DPP No. 18

SYLLABUS : INDEFINITE INTEGRATION

1. If $\int \frac{1}{1+\sin x}\,dx = \tan\left(\frac{x}{2}+a\right) + C$, then

(A) $a = -\frac{\pi}{4}, C \in R$ (B) $a = \frac{\pi}{4}, C \in R$ (C) $a = \frac{5\pi}{4}, C \in R$ (D) $a = \frac{\pi}{3}, C \in R$

2. If $\int(\sin 2x - \cos 2x)\,dx = \frac{1}{\sqrt{2}}\sin(2x - a) + C$, then

(A) $a = \frac{5\pi}{4}, C \in R$ (B) $a = -\frac{5\pi}{4}, C \in R$ (C) $a = \frac{\pi}{4}, C \in R$ (D) $a = \frac{\pi}{2}, C \in R$

3. If $\int \frac{\cos 4x + 1}{\cot x - \tan x}\,dx = A\cos 4x + B$; where A & B are constants, then

(A) A = – 1/4 & B may have any value (B) A = – 1/8 & B may have any value
(C) A = – 1/2 & B = – 1/4 (D) A = B = 1/2

4. The value of $\int \frac{\cos 2x}{\cos x}\,dx$ is equal to

5. The value of $\int \frac{dx}{\sin x \cdot \sin(x+\alpha)}$ is equal to

6. The value of $\int 5^{5^{5^x}} \cdot 5^{5^x} \cdot 5^x\,dx$ is equal to

(A) $\frac{5^{5^x}}{(\ell n 5)^3} + C$ (B) $5^{5^{5^x}}(\ell n\,5)^3 + C$ (C) $\frac{5^{5^{5^x}}}{(\ell n\,5)^3} + C$ (D) $\frac{5^{5^{5x}}}{(\ell n\,5)^2} + C$

7. If $\int \frac{2^x}{\sqrt{1-4^x}}\,dx = K\sin^{-1}(2^x) + C$, then the value of K is equal to

(A) $\ell n\,2$ (B) $\frac{1}{2}\ell n\,2$ (C) $\frac{1}{2}$ (D) $\frac{1}{\ell n\,2}$

8. If $y = \int \frac{dx}{\left(1+x^2\right)^{3/2}}$ and y = 0 when x = 0, then value of y when x = 1, is:

(A) $\sqrt{\frac{2}{3}}$ (B) $\sqrt{2}$ (C) $3\sqrt{2}$ (D) $\frac{1}{\sqrt{2}}$

9. The value of $\int \tan^3 2x \sec 2x \, dx$ is equal to :

(A) $\frac{1}{3}\sec^3 2x - \frac{1}{2}\sec 2x + C$ (B) $-\frac{1}{6}\sec^3 2x - \frac{1}{2}\sec 2x + C$

(C) $\frac{1}{6}\sec^3 2x - \frac{1}{2}\sec 2x + C$ (D) $\frac{1}{3}\sec^3 2x + \frac{1}{2}\sec 2x + C$

10. The value of $\int \frac{\cos 2x}{(\sin x + \cos x)^2} \, dx$ is equal to

(A) $\frac{-1}{\sin x + \cos x} + C$ (B) $\ell n (\sin x + \cos x) + C$

(C) $\ell n (\sin x - \cos x) + C$ (D) $\ell n (\sin x + \cos x)^2 + C$

11. The value of $\int [1 + \tan x \, . \tan(x+\alpha)] \, dx$ is equal to

(A) $\cos \alpha \, . \, \ell n \left|\frac{\sin x}{\sin(x+\alpha)}\right| + C$ (B) $\tan \alpha \, . \, \ell n \left|\frac{\sin x}{\sin(x+\alpha)}\right| + C$

(C) $\cot \alpha \, . \, \ell n \left|\frac{\sec(x+\alpha)}{\sec x}\right| + C$ (D) $\cot \alpha \, . \, \ell n \left|\frac{\cos(x+\alpha)}{\cos x}\right| + C$

12. The value of $\int \frac{1 - x^7}{x\left(1 + x^7\right)} \, dx$ is equal to

(A) $\ell n |x| + \frac{2}{7} \ell n |1 + x^7| + C$ (B) $\ell n |x| - \frac{2}{7} \ell n |1 - x^7| + C$

(C) $\ell n |x| - \frac{2}{7} \ell n |1 + x^7| + C$ (D) $\ell n |x| + \frac{2}{7} \ell n |1 - x^7| + C$

13. The value of $\int (x-1) e^{-x} \, dx$ is equal to

(A) $-xe^x + C$ (B) $xe^x + C$ (C) $-xe^{-x} + C$ (D) $xe^{-x} + C$

14. The value of $\int [f(x)g''(x) - f''(x)g(x)] \, dx$ is equal to

(A) $\frac{f(x)}{g'(x)} + C$ (B) $f'(x)\, g(x) - f(x)\, g'(x) + C$

(C) $f(x)\, g'(x) - f'(x)\, g(x) + C$ (D) $f(x)\, g'(x) + f'(x)\, g'(x) + C$

15. $\int \frac{x \ell n x}{\left(x^2 - 1\right)^{3/2}} \, dx$ equals

(A) $\text{arcsec} x - \frac{\ell n x}{\sqrt{x^2 - 1}} + C$ (B) $\sec^{-1} x + \frac{\ell n\, x}{\sqrt{x^2 - 1}} + C$

(C) $\cos^{-1} x - \frac{\ell n\, x}{\sqrt{x^2 - 1}} + C$ (D) $\sec x - \frac{\ell n\, x}{\sqrt{x^2 - 1}} + C$

16. The value of $\int \frac{1}{x^2(x^4+1)^{3/4}}\,dx$ is equal to

(A) $\left(1+\frac{1}{x^4}\right)^{1/4}+C$ (B) $(x^4+1)^{1/4}+C$ (C) $\left(1-\frac{1}{x^4}\right)^{1/4}+C$ (D) $-\left(1+\frac{1}{x^4}\right)^{1/4}+C$

17. The value of $\int \frac{dx}{x\sqrt{1-x^3}}$ is equal to

(A) $\frac{1}{3}\,\ell n\left|\frac{\sqrt{1-x^3}-1}{\sqrt{1-x^3}+1}\right|+C$ (B) $\frac{1}{3}\ell n\left|\frac{\sqrt{1-x^2}+1}{\sqrt{1-x^2}-1}\right|+C$

(C) $\frac{1}{3}\,\ell n\left|\frac{1}{\sqrt{1-x^3}}\right|+C$ (D) $\frac{1}{3}\,\ell n\,|1-x^3|+C$

18. If $\int\sqrt{\frac{\cos^3 x}{\sin^{11} x}}\,dx=-2\left(A\tan^{\frac{-9}{2}}x+B\tan^{\frac{-5}{2}}x\right)+C$, then

(A) $A=\frac{1}{9}$, $B=\frac{-1}{5}$ (B) $A=\frac{1}{9}$, $B=\frac{1}{5}$ (C) $A=-\frac{1}{9}$, $B=\frac{1}{5}$ (D) $A=-\frac{1}{9}$, $B=-\frac{1}{5}$

19. Antiderivative of $\frac{\sin^2 x}{1+\sin^2 x}$ w.r.t. x is :

(A) $x-\frac{\sqrt{2}}{2}\arctan\left(\sqrt{2}\tan x\right)+C$ (B) $x-\frac{1}{\sqrt{2}}\arctan\left(\frac{\tan x}{\sqrt{2}}\right)+C$

(C) $x-\sqrt{2}\arctan\left(\sqrt{2}\tan x\right)+C$ (D) $x-\sqrt{2}\arctan\left(\frac{\tan x}{\sqrt{2}}\right)+C$

20. Integrate $\frac{1}{1-\cot x}$

(A) $\frac{1}{2}\log|\sin x-\cos x|+\frac{1}{2}x+C$ (B) $\frac{1}{2}\log|\sin x+\cos x|+\frac{1}{2}x+C$

(C) $\frac{1}{2}\log|\sin x+\cos x|-\frac{1}{2}x+C$ (D) $\frac{1}{2}\log|\sin x-\cos x|-\frac{1}{2}x+C$

21. Integrate with respect to x :

$\frac{1}{2+\cos x}$

22. Integrate with respect to x :

$\frac{1}{2-\cos x}$

23. Integrate with respect to x :

$$\frac{2\sin x + 2\cos x}{3\cos x + 2\sin x}$$

24. Integrate with respect to x :

$$\frac{1}{1+\sin x + \cos x}$$

25. Integrate with respect to x :

$$\frac{1}{2+\sin^2 x}$$

ANSWER KEY OF DPP NO. : 18

1. (A) **2.** (B) **3.** (B) **4.** $2\sin x - \ln|\sec x + \tan x| + C$

5. $\text{cosec } a \ln\left|\frac{\sin x}{\sin(x+\alpha)}\right| + C$ **6.** (C) **7.** (D) **8.** (D) **9.** (C)

10. (B) **11.** (C) **12.** (C) **13.** (C) **14.** (C) **15.** (A) **16.** (D)

17. (A) **18.** (B) **19.** (A) **20.** (A) **21.** $\frac{2}{\sqrt{3}}\tan^{-1}\left(\frac{\tan x/2}{\sqrt{3}}\right) + C$

22. $\frac{2}{\sqrt{3}}\tan^{-1}\left(\sqrt{3}\tan\frac{x}{2}\right) + C$ **23.** $\frac{10}{13}x - \frac{2}{13}\ln|3\cos x + 2\sin x| + C$

24. $\ln\left|1+\tan\frac{x}{2}\right| + C$ **25.** $\frac{1}{\sqrt{6}}\tan^{-1}\left(\frac{\sqrt{3}\tan x}{\sqrt{2}}\right) + C$