DPP
DAILY PRACTICE PROBLEMS

CLASS : XIIth **SUBJECT : MATHS**
DATE : **DPP NO. : 3**

Topic :-INTEGRALS

1. If $f(x) = \lim_{n\to\infty}[2x + 4x^3 + ... + 2nx^{2n-1}](0 < x < 1)$, then $\int f(x)dx$ is equal to

   a) $-\sqrt{1-x^2}$ b) $\frac{1}{\sqrt{1-x^2}}$ c) $\frac{1}{x^2-1}$ d) $\frac{1}{1-x^2}$

2. $\int \frac{dx}{\sin x - \cos x + \sqrt{2}}$ equals

   a) $-\frac{1}{\sqrt{2}}\tan\left(\frac{x}{2}+\frac{\pi}{8}\right)+c$ b) $\frac{1}{\sqrt{2}}\tan\left(\frac{x}{2}+\frac{\pi}{8}\right)+c$ c) $\frac{1}{\sqrt{2}}\cot\left(\frac{x}{2}+\frac{\pi}{8}\right)+c$ d) $-\frac{1}{\sqrt{2}}\cot\left(\frac{x}{2}+\frac{\pi}{8}\right)+c$

3. $\int_0^{\pi/2} \frac{\cos x}{1+\sin x}\,dx$ is equal to

   a) $\log 2$ b) $2\log 2$ c) $(\log 2)^2$ d) $\frac{1}{2}\log 2$

4. The integral $\int_0^1 \frac{2\sin^{-1}\frac{x}{2}}{x}\,dx$ equals

   a) $\int_0^{\pi/6} \frac{x}{\tan x}\,dx$ b) $\int_0^{\pi/6} \frac{2x}{\tan x}\,dx$ c) $\int_0^{\pi/2} \frac{2x}{\tan x}\,dx$ d) $\int_0^{\pi/6} \frac{x}{\sin x}\,dx$

5. If $\int_2^e \left(\frac{1}{\log x} - \frac{1}{(\log x)^2}\right)dx = a + \frac{b}{\log 2}$, then

   a) $a = e, b = -2$ b) $a = e, b = 2$ c) $a = -e, b = 2$ d) None of these

6. The value of $\int_0^8 |x-5|\,dx$ is

   a) 17 b) 12 c) 9 d) 18

7. $\int_0^1 \frac{x\,dx}{[x+\sqrt{1-x^2}]\sqrt{1-x^2}}$ is equal to

   a) 0 b) 1 c) $\frac{\pi}{4}$ d) $\frac{\pi^2}{2}$

8. $\int_0^1 \cot^{-1}(1-x+x^2)\,dx$ is equal to

   a) $\pi - \log 2$ b) $\pi + \log 2$ c) $\frac{\pi}{2} + \log 2$ d) $\frac{\pi}{2} - \log 2$

9. $\int_8^{15} \frac{dx}{(x-3)\sqrt{x+1}}$ is equal to

   a) $\frac{1}{2}\log\frac{5}{3}$ b) $\frac{1}{3}\log\frac{5}{3}$ c) $\frac{1}{2}\log\frac{3}{5}$ d) $\frac{1}{5}\log\frac{3}{5}$

10. $\int \{1 + 2\tan x(\tan x + \sec x)\}^{1/2} dx$ is equal to
    a) $\log \sec x\,(\sec x - \tan x) + C$
    b) $\log \operatorname{cosec}(\sec x + \tan x) + C$
    c) $\log \sec x(\sec x + \tan x + C)$
    d) $\log(\sec x + \tan x) + C$

11. If $I_1 = \int_0^\infty \frac{1}{1+x^4} dx$ and $I_2 = \int_0^\infty \frac{x^2}{1+x^4} dx$. Then $\frac{I_1}{I_2} =$
    a) 1 b) 2 c) 1/2 d) None of these

12. $\int \frac{\sin x\, dx}{3 + 4\cos^2 x}$ is equal to
    a) $\log(3 + 4\cos^2 x) + c$
    b) $\frac{1}{2\sqrt{3}} \tan^{-1}\left(\frac{\cos x}{\sqrt{3}}\right) + c$
    c) $-\frac{1}{2\sqrt{3}} \tan^{-1}\left(\frac{2\cos x}{\sqrt{3}}\right) + c$
    d) $\frac{1}{2\sqrt{3}} \tan^{-1}\left(\frac{2\cos x}{\sqrt{3}}\right) + c$

13. For any integer n, the integral
$\int_0^\pi e^{\cos^2 x} \cos^3(2n+1)x\, dx$ has the value
    a) π b) 1 c) 0 d) None of these

14. If $\frac{d}{dx}\{f(x) = \frac{1}{1+x^2}$, then $\frac{d}{dx}\{f(x^3)\}$ is
    a) $\frac{3x}{1+x^3}$ b) $\frac{3x^2}{1+x^6}$ c) $\frac{-6x^5}{(1+x^6)^2}$ d) $\frac{-6x^5}{1+x^6}$

15. $\int_0^\pi [\cot x] dx$, [.] denotes the greatest integer function, is equal to
    a) $\frac{\pi}{2}$ b) 1 c) -1 d) $-\frac{\pi}{2}$

16. $\int_{-3}^{2} \{|x+1| + |x+2| + |x-1|\} dx$ is equal to
    a) $\frac{31}{2}$ b) $\frac{35}{2}$ c) $\frac{47}{2}$ d) $\frac{39}{2}$

17. $\int_0^3 |x^3 + x^2 + 3x| dx$ is equal to
    a) $\frac{171}{2}$ b) $\frac{171}{4}$ c) $\frac{170}{4}$ d) $\frac{170}{3}$

18. $\int \frac{dx}{\sin x \cos x}$ is equal to
    a) $\log|\sin x| + c$ b) $\log|\tan x| + c$ c) $\log|\sec x| + c$ d) None of these

19. $\int_0^{2n\pi} \left\{|\sin x| - \left|\frac{1}{2}\sin x\right|\right\} dx$ equals
    a) n b) $2n$ c) $-2n$ d) None of these

20. If $\int_a^b x^3\,dx = 0$ and if $\int_a^b x^2\,dx = \frac{2}{3}$, then the values of a and b are respectively

a) $1,1$ b) $-1,-1$ c) $1,-1$ d) $-1,1$