DPP
DAILY PRACTICE PROBLEMS

CLASS : XIIth
DATE :

SUBJECT : MATHS
DPP NO. : 8

Topic :-INTEGRALS

1. $\int_0^{1000} e^{x-[x]}dx$ is

   a) $e^{1000} - 1$
   b) $\frac{e^{1000} - 1}{e - 1}$
   c) $1000(e - 1)$
   d) $\frac{e - 1}{1000}$

2. $\int \frac{(\tan^{-1}x)^3}{(1 + x^2)}dx$ is equal to

   a) $3(\tan^{-1}x)^2 + c$
   b) $\frac{(\tan^{-1}x)^4}{4} + c$
   c) $(\tan^{-1}x)^4 + c$
   d) None of these

3. The value of $\int_0^{\pi} |\sin^3\theta|d\theta$ is

   a) 0
   b) π
   c) $\frac{4}{3}$
   d) $\frac{3}{8}$

4. If $d[f(x)] = e^{\tan x}\sec^2 x\, dx$, then $f(x)$ is equal to

   a) $e^{\tan x} + c$
   b) $e^{\sec^2 x} + c$
   c) $e^{\sin x} + c$
   d) None of these

5. The value of $\int_1^2 \{f(g(x))\}^{-1}f'(g(x))g'(x)dx$, where $g(1) = g(2)$, is equal to

   a) 1
   b) 2
   c) 0
   d) None of these

6. Let f be a function such that $f(1) = 4$ and $f'(x) \geq 2$ for $1 \leq x < 4$. How small can $f(4)$ possibly be?

   a) 8
   b) 12
   c) 16
   d) 10

7. $\int \frac{f'(x)}{f(x)\log[f(x)]}dx$ is equal to

   a) $\frac{f(x)}{\log f(x)} + c$
   b) $f(x).\log f(x) + c$
   c) $\log[\log f(x)] + c$
   d) $\frac{1}{\log[\log f(x)]} + c$

8. $\int_0^{\pi/2} \frac{2\sqrt{\cos\theta}}{3(\sqrt{\sin\theta} + \sqrt{\cos\theta})}d\theta$ is equal to

   a) $\frac{\pi}{6}$
   b) $\frac{\pi}{4}$
   c) $\frac{\pi}{2}$
   d) None of these

9. The value of $\lim_{n\to\infty}\left[\frac{n}{n^2 + 1^2} + \frac{n}{n^2 + 2^2} + \dots + \frac{n}{n^2 + n^2}\right]$

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

10. The value of $\int_{-\pi}^{\pi} \sin x\ f(\cos x)dx$ is

    a) π b) 2π c) $2f(1)$ d) None of these

11. If $\int \frac{\sin x}{\cos x(1+\cos x)}dx = f(x) + c$, then $f(x)$ is equal to

    a) $\log\left|\frac{1+\cos x}{\cos x}\right|$ b) $\log\left|\frac{\cos x}{1+\cos x}\right|$ c) $\log\left|\frac{\sin x}{1+\sin x}\right|$ d) $\log\left|\frac{1+\sin x}{\sin x}\right|$

12. If $f(x)$ satisfies the requirements of Rolle's Theorem in $[1, 2]$ and $f'(x)$ is continuous in $[1, 2]$, then $\int_1^2 f'(x)dx$ is equal to

    a) 0   b) 1   c) 3   d) -1

13. The value of $\int e^{2x}(2\sin 3x + 3\cos 3x)dx$ is

    a) $e^{2x}\sin 3x + c$ b) $e^{2x}\cos 3x + c$ c) $e^{2x} + c$ d) $e^{2x}(2\sin 3x) + c$

14. $\int_{-2}^{2} |[x]|\ dx$ is equal to

    a) 1   b) 2   c) 3   d) 4

15. If $\int_0^{\pi/2} \cos^n x \sin^n x\ dx = \lambda\int_0^{\pi/2} \sin^n x\ dx$, then $\lambda =$

    a) $\frac{1}{2^{n-1}}$ b) $\frac{1}{2^{n+1}}$ c) $\frac{1}{2^n}$ d) $\frac{1}{2}$

16. If x satisfies the equation

$$x^2\left(\int_0^1 \frac{dt}{t^2+2t\cos\alpha+1}\right) - x\left(\int_{-3}^3 \frac{t^2\sin 2t}{t^2+1}dt\right) - 2 = 0$$

$(0 < \alpha < \pi)$, then the value of x is

    a) $\pm 2\sqrt{\frac{\sin\alpha}{\alpha}}$ b) $\pm\sqrt{\frac{\sin\alpha}{\alpha}}$ c) $\pm 4\sqrt{\frac{\sin\alpha}{\alpha}}$ d) None of these

17. $\int_{\pi/6}^{\pi/3} \frac{dx}{1+\sqrt{\tan x}}$ is equal to

    a) $\frac{\pi}{12}$ b) $\frac{\pi}{2}$ c) $\frac{\pi}{6}$ d) $\frac{\pi}{4}$

18. $\int_0^2 [x^2]dx$ is

    a) $2-\sqrt{2}$ b) $2+\sqrt{2}$ c) $\sqrt{2}-1$ d) $-\sqrt{2}-\sqrt{3}+5$

19. If $\int f(x)\sin x \cos x\ dx = \frac{1}{2(b^2-a^2)}\log f(x) + c$, the $f(x)$ is equal to

    a) $\frac{1}{a^2\sin^2 x + b^2\cos^2 x}$ b) $\frac{1}{a^2\sin^2 x - b^2\cos^2 x}$ c) $\frac{1}{a^2\cos^2 x + b^2\sin^2 x}$ d) $\frac{1}{a^2\cos^2 x - b^2\sin^2 x}$

20. If $f(x) = f(a-x)$, then $\int_0^a f(x)dx$ is equal to

    a) $\int_0^a f(x)dx$ b) $\frac{a^2}{2}\int_0^a f(x)dx$ c) $\frac{a}{2}\int_0^a f(x)dx$ d) $-\frac{a}{2}\int_0^a f(x)dx$