DPP
DAILY PRACTICE PROBLEMS

CLASS : XIIth **SUBJECT : MATHS**

DATE : **DPP NO. : 1**

Topic :-INTEGRALS

1. Let $f(x)=\int_0^x |x-2|dx\,, x\geq 0.$ Then, $f'(x)$ is
   a) Continuous and non differentiable at $x=2$
   b) Discontinuous at $x=4$
   c) Neither continuous nor differentiable at $x=2$
   d) Non-differentiable at $x=4$

2. If $f(t)$ is an odd function, then $\int_0^x f(t)dt$ is
   a) An odd function
   b) An even function
   c) Neither even nor odd
   d) 0

3. $\int \frac{\sec x \operatorname{cosec} x}{2\cot x-\sec x \operatorname{cosec} x}\,dx$ is equal to
   a) $\log|\sec x+\tan x|+c$
   b) $\log|\sec x+\operatorname{cosec} x|+c$
   c) $\frac{1}{2}\log|\sec 2x+\tan 2x|+c$
   d) $\log|\sec 2x+\operatorname{cosec} 2x|+c$

4. $\int_0^{\pi}\frac{\theta\sin\theta}{1+\cos^2\theta}d\theta$is equal to
   a) $\frac{\pi^2}{2}$
   b) $\frac{\pi^3}{3}$
   c) π^2
   d) $\frac{\pi^2}{4}$

5. The value of $\left[\int_0^{\sin^2\theta}\sin^{-1}\sqrt{\phi}\;d\phi+\int_0^{\cos^2\theta}\cos^{-1}\sqrt{\phi}\;d\phi\right]$ is equal to
   a) π
   b) $\pi/2$
   c) $\pi/3$
   d) $\pi/4$

6. $\int_0^{\pi/2}\frac{dx}{1+\tan^3 x}$is equal to
   a) π
   b) $\frac{\pi}{2}$
   c) $\frac{\pi}{4}$
   d) $\frac{3\pi}{2}$

7. Let $I=\int_0^1\frac{\sin x}{\sqrt{x}}\,dx$ and $J=\int_0^1\frac{\cos x}{\sqrt{x}}\,dx$. Then, which one of the following is true?
   a) $I>\frac{2}{3}$ and $J<2$
   b) $I>\frac{2}{3}$ and $J>2$
   c) $I<\frac{2}{3}$ and $J<2$
   d) $I<\frac{2}{3}$ and $J>2$

8. If $f(x)=\begin{cases}|x|, & -1\leq x\leq 1\\ |x-2|, & 1<x\leq 3\end{cases}$, then $\int_{-1}^3 f(x)dx$ is equal to
   a) 0
   b) 1
   c) 2
   d) 4

9. $\int\frac{1}{x\,(x^n+1)}dx$ is equal to
   a) $\frac{1}{n}\log\left(\frac{x^n}{x^n+1}\right)+C$
   b) $\frac{1}{n}\log\left(\frac{x^n+1}{x^n}\right)$
   c) $\log\left(\frac{x^n}{x^n+1}\right)+C$
   d) None of these

10. $\int_0^{1/2}|\sin\pi\,x|\,dx$ is equal to

a) 0 b) π c) $-\pi$ d) $1/\pi$

11. The value of the integral $\int_0^\pi \frac{1}{a^2-2a\cos x+1}dx(a>1)$, is
a) $\frac{\pi}{1-a^2}$ b) $\frac{\pi}{a^2-1}$ c) $\frac{2\pi}{a^2-1}$ d) $\frac{2\pi}{1-a^2}$

12. If $I=\int_0^1 \sqrt{1+x^3}dx$ then
a) $I>2$ b) $I\neq\frac{\sqrt{5}}{2}$ c) $I>\frac{\sqrt{7}}{2}$ d) None of these

13. Assuming that f is everywhere continuous, $\frac{1}{c}\int_{ac}^{bc} f\left(\frac{x}{c}\right)dx$ is equal to
a) $\frac{1}{c}\int_a^b f(x)\,dx$ b) $\int_a^b f(x)\,dx$ c) $c\int_a^b f(x)\,dx$ d) $\int_{ac^2}^{bc^2} f(x)\,dx$

14. The value of the integral $\int e^x\left(\frac{1-x}{1+x}\right)^2 dx$ is
a) $e^x\left(\frac{1-x}{1+x^2}\right)+c$ b) $e^x\left(\frac{1+x}{1+x^2}\right)+c$ c) $\frac{e^x}{1+x^2}+c$ d) $e^x(1-x)+c$

15. Let $\frac{d}{dx}(F(x))=\frac{e^{\sin x}}{x}, x>0$. If $\int_1^4 \frac{3}{x}e^{\sin x^3}dx=F(k)-f(1)$, then one of the possible values of k, is
a) 64 b) 15 c) 16 d) 63

16. The values of $'a'$ for which $\int_0^a(3x^2+4x-5)\,dx<a^3-2$ are
a) $\frac{1}{2}<a<2$ b) $\frac{1}{2}\leq a\leq 2$ c) $a\leq\frac{1}{2}$ d) $a\geq 2$

17. The value of the integral $\int\frac{\log(x+1)-\log x}{x(x+1)}dx$ is
a) $\frac{1}{2}[\log(x+1)]^2+\frac{1}{2}(\log x)^2+\log(x+1)\log x+C$
b) $-[\{\log(x+1)\}^2-(\log x)^2]+\log(x+1)\cdot\log x+C$
c) $\frac{1}{2}[\log(1+1/x)]^2+C$
d) None of these

18. The value of $\int_0^{2\pi}[2\sin x]\,dx$, where $[\cdot]$ represents the greatest integral functions, is
a) $-\frac{5\pi}{3}$ b) $-\pi$ c) $\frac{5\pi}{3}$ d) -2π

19. $\int_0^1 \frac{d}{dx}\left[\sin^{-1}\left(\frac{2x}{1+x^2}\right)\right]dx$ is equal to
a) 0 b) π c) $\frac{\pi}{2}$ d) $\frac{\pi}{4}$

20. Let $f(x)$ be a function satisfying $f'(x)=f(x)$ with $f(0)=1$ and $g(x)$ be a function that satisfies $f(x)+g(x)=x^2$. Then, the value of the integral $\int_0^1 f(x)\,g(x)dx$, is
a) $e-\frac{e^2}{2}-\frac{5}{2}$ b) $e+\frac{e^2}{2}-\frac{3}{2}$ c) $e-\frac{e^2}{2}-\frac{3}{2}$ d) $e+\frac{e^2}{2}+\frac{5}{2}$