DPP
DAILY PRACTICE PROBLEMS

CLASS : XIIth **SUBJECT : MATHS**
DATE : **DPP NO. : 4**

Topic :-INTEGRALS

1. The value of $\int_0^{\pi/2} \text{cosec}\,(x-\pi/3)\text{cosec}(x-\pi/6)dx$, is
   a) $2\log 3$ b) $-2\log 3$ c) $\log 3$ d) None of these

2. The primitive function of the function $f(x)=\frac{\sqrt{(a^2-x^2)}}{x^4}$ is
   a) $c+\frac{\sqrt{a^2-x^2}}{3a^2x^3}$ b) $c-\frac{(a^2-x^2)^{3/2}}{2a^2x^2}$ c) $c-\frac{(a^2-x^2)^{3/2}}{3a^2x^3}$ d) None of these

3. If $f(x)=\begin{cases} x, & \text{for } x<1 \\ x-1, & \text{for } x\geq 1 \end{cases}$, then $\int_0^2 x^2 f(x)dx$ is equal to
   a) 1 b) $\frac{4}{3}$ c) $\frac{5}{3}$ d) $\frac{5}{2}$

4. $\int \frac{x^2+x-6}{(x-2)(x-1)}dx$
   a) $x+2\log(x-1)+c$ b) $2x+2\log(x-1)+c$ c) $x+4\log(1-x)+c$ d) $x+4\log(x-1)+c$

5. $\int \frac{x^3}{(1+x^2)^{1/3}}dx$ is equal to
   a) $\frac{20}{3}(1+x^2)^{2/3}(2x^2-3)+C$
   b) $\frac{3}{20}(1+x^2)^{2/3}(2x^2-3)+C$
   c) $\frac{3}{20}(1+x^2)^{2/3}(2x^2+3)+C$
   d) None of these

6. The equation $\int_{-\pi/4}^{\pi/4}\left\{a|\sin x|+\frac{b\sin x}{1+\cos x}+c\right\}dx=0$, where a, b, c are constants, gives a relation between
   a) a, $b$and c b) a and c c) a and b d) b and c

7. The value of $\int_2^4 \{|x-2|+|x-3|\}dx$is
   a) 1 b) 2 c) 3 d) 5

8. If $g(x)=\int_0^x \cos^4 t\,dt$, then $g(x+\pi)$ equals
   a) $g(x)+g(\pi)$ b) $g(x)-g(\pi)$ c) $g(x)g(\pi)$ d) $\frac{g(x)}{g(\pi)}$

9. $\int \cos^3 x\, e^{\log(\sin x)} dx$ is equal to

a) $-\frac{\sin^4 x}{4}+C$ b) $-\frac{\cos^4 x}{4}+C$ c) $\frac{e^{\sin x}}{4}+C$ d) None of these

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

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

11. The value of $\int \frac{ax^2-b}{x\sqrt{c^2x^2-(ax^2+b)^2}}dx$, is

a) $\sin^{-1}\left(\frac{ax+\frac{b}{x}}{c}\right)+k$ b) $\sin^{-1}\left(\frac{ax^2+\frac{b}{x^2}}{c}\right)+k$ c) $\cos^{-1}\left(\frac{ax+b/x}{c}\right)+k$ d) $\cos^{-1}\left(\frac{ax^2+\frac{b}{x^2}}{c}\right)+k$

12. If $f(x)=\int_{-1}^{x}|t|dt$, then for any $x\geq 0$, $f(x)$ equals

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

13. Let $I_1=\int_1^2 \frac{1}{\sqrt{1+x^2}}dx$ and $I_2=\int_1^2 \frac{1}{x}dx$. Then

a) $I_1>I_2$ b) $I_2>I_1$ c) $I_1=I_2$ d) $I_1>2I_2$

14. The value of $\int_{-\pi}^{\pi}(1-x^2)\sin x\cos^2 x\, dx$ is

a) 0 b) $\pi-\frac{\pi^3}{3}$ c) $2\pi-\pi^3$ d) $\frac{7}{2}-2\pi^3$

15. If $I_n=\int_0^{\pi/2} x^n \sin x dx$, then I_4+12I_2 is equal to

a) 4π b) $3\left(\frac{\pi}{2}\right)^3$ c) $\left(\frac{\pi}{2}\right)^2$ d) $4\left(\frac{\pi}{2}\right)^3$

16. The value of the integral $\int_0^2 x[x]dx$, is

a) $\frac{7}{2}$ b) $\frac{3}{2}$ c) $\frac{5}{2}$ d) None of these

17. $\int_{-1}^{0} \frac{dx}{x^2+2x+2}$ is equal to

a) 0 b) $\pi/4$ c) $\pi/2$ d) $-\pi/4$

18. The value of $\int_{-\pi/4}^{\pi/4} x^3\sin^4 x\, dx$ is

a) $\frac{\pi}{4}$ b) $\frac{\pi}{2}$ c) $\frac{\pi}{8}$ d) 0

19. Let f be apositive function. Let $I_1=\int_{1-k}^{k} xf\{x(1-x)\}, I_2=\int_{1-k}^{k} f\{x(1-x)\}dx$ where $2k-1>0$. Then, $\frac{I_1}{I_2}$ is

a) 2 b) k c) $\frac{1}{2}$ d) 1

20. If $I_n=\int_0^{\pi/4}\tan^n x dx$, then $\lim_{n\to\infty} n(I_{n+1}+I_{n-1})$ equals

a) 1 b) 2 c) $\pi/4$ d) π