

Topic :-INTEGRALS

1. 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) $-\left[\{\log(x+1)\}^2 - (\log x)^2\right] + \log(x+1)\log x + c$
 - c) $\left[\log\left(1 + \frac{1}{x}\right)\right]^2 + c$
 - d) None of the above

2. The value of $I = \int_0^1 x \left|x - \frac{1}{2}\right| dx$ is
 - a) $\frac{1}{3}$
 - b) $\frac{1}{4}$
 - c) $\frac{1}{8}$
 - d) None of these

3. $\int \frac{a^{x/2}}{\sqrt{a^{-x} - a^x}} dx =$
 - a) $\frac{1}{\log a} \sin^{-1}(a^x)$
 - b) $\frac{1}{\log a} \tan^{-1}(a^x)$
 - c) $2\sqrt{a^{-x} - a^x}$
 - d) $\log(a^x - 1)$

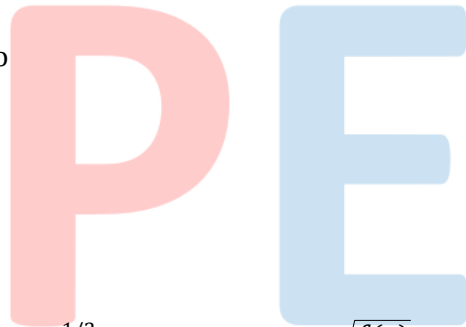
4. If $\int_{\log 2}^x \frac{du}{(e^u - 1)^{1/2}} = \frac{\pi}{6}$, then e^x is equal to
 - a) 1
 - b) 2
 - c) 4
 - d) -1

5. $\int \{f(x)g''(x) - f''(x)g(x)\} dx$ is equal to
 - a) $\frac{f(x)}{g'(x)}$
 - b) $f'(x)g(x) - f(x)g'(x)$
 - c) $f(x)g'(x) - f'(x)g(x)$
 - d) $f(x)g'(x) + f'(x)g(x)$

6. The value of $\int_{-\pi/4}^{\pi/4} x^3 \sin^4 x dx$, is equal to
 - a) $\frac{\pi}{4}$
 - b) $\frac{\pi}{2}$
 - c) $\frac{\pi}{8}$
 - d) 0

7. The value of $\int_0^{\pi/2} \sin^8 x dx$ is
 - a) $\frac{105\pi}{32(4!)}$
 - b) $\frac{105\pi}{14(4!)}$
 - c) $\frac{105}{16\pi(4!)}$
 - d) None of these

8. $\int_{-\pi/2}^{\pi/2} \frac{|x|}{8 \cos^2 2x + 1} dx$ has the value
 a) $\frac{\pi^2}{6}$ b) $\frac{\pi^2}{12}$ c) $\frac{\pi^2}{24}$ d) None of these
9. If $\int f(x) \cos x \, dx = \frac{1}{2}\{f(x)\}^2 + c$, then $f(x)$ is
 a) $x + c$ b) $\sin x + c$ c) $\cos x + c$ d) c
10. If $f(x) = \frac{x+2}{2x+3}$. Then, $\int \left(\frac{f(x)}{x^2}\right)^{1/2} dx$ is equal to $\frac{1}{\sqrt{2}}g\left(\frac{1+\sqrt{2f(x)}}{1-\sqrt{2f(x)}}\right) - \frac{\sqrt{2}}{3}h\left(\frac{\sqrt{3f(x)}+\sqrt{2}}{\sqrt{3f(x)}-\sqrt{2}}\right) + c$ where
 a) $g(x) = \tan^{-1} x, h(x) = \log|x|$ b) $g(x) = \log|x|, h(x) = \tan^{-1} x$
 c) $g(x) = h(x) = \tan^{-1} x$ d) $g(x) = \log|x|, h(x) = \log|x|$
11. $\int 5^{5^{5x}} \cdot 5^{5x} \cdot 5^x \, dx$ is equal to
 a) $\frac{5^{5x}}{(\log 5)^3} + C$ b) $5^{5^{5x}} (\log 5)^3 + C$ c) $\frac{5^{5^{5x}}}{(\log 5)^3} + C$ d) None of these
12. If $f(t) = \int_{-t}^t \frac{e^{-|x|}}{2} dx$, then $\lim_{t \rightarrow \infty} f(t)$ is equal to
 a) 1 b) $\frac{1}{2}$ c) 0 d) -1
13. $\int \frac{\cos 2x}{(\sin x + \cos x)^2} dx$ is equal to
 a) $\frac{-1}{\sin x + \cos x} + C$
 b) $\log(\sin x + \cos x) + C$
 c) $\log(\sin x - \cos x) + C$
 d) $\log(\sin x + \cos x)^2 + C$
14. If the primitive of $\sin^{-3/2} x \sin^{-1/2}(x + \theta)$ is $-2 \operatorname{cosec} \theta \sqrt{f(x)} + c$, then
 a) $f(x) = \frac{\sin x}{\sin(x + \theta)}$ b) $f(x) = \tan(x + \theta)$ c) $f(x) = \frac{\sin(x + \theta)}{\sin x}$ d) $f(x) = \frac{\tan(x + \theta)}{\sin x}$
15. $\int \frac{x^4 - 1}{x^2 \sqrt{x^4 + x^2 + 1}} dx$ is equal to
 a) $\frac{x}{\sqrt{x^4 + x^2 + 1}} + C$ b) $\frac{\sqrt{x^4 + x^2 + 1}}{x} + C$ c) $\frac{2x}{\sqrt{x^4 + x^2 + 1}} + C$ d) $\frac{\sqrt{x^4 + x^2 + 1}}{2x} + C$
16. $\int 32x^3 (\log x)^2 \, dx$ is equal to
 a) $8x^4 (\log x)^2 + c$ b) $x^4 \{8(\log x)^2 - 4 \log x + 1\} + c$
 c) $x^4 \{8(\log x)^2 - 4 \log x\} + c$ d) $x^3 \{(\log x)^2 + 2 \log x\} + c$
17. $\int \frac{e^x(1 + \sin x)}{1 + \cos x} dx$ is equal to
 a) $e^x \tan\left(\frac{x}{2}\right) + c$ b) $e^x \tan x + c$ c) $e^x \left(\frac{1 + \sin x}{1 - \cos x}\right) + c$ d) $c - e^x \cot\left(\frac{x}{2}\right)$
18. If $\int \log(\sqrt{1-x} + \sqrt{1+x}) dx = x f(x) + Ax + B \sin^{-1} x + C$, then



a) $f(x) = \log(\sqrt{1-x} + \sqrt{1+x})$

b) $A = 1/3$

c) $B = 2/3$

d) $B = -1/2$

19. $\int_0^{\pi/4} \log(1 + \tan x) dx$ is equal to

a) $\frac{\pi}{8} \log_e 2$

b) $\frac{\pi}{4} \log_2 e$

c) $\frac{\pi}{4} \log_e 2$

d) $\frac{\pi}{8} \log_e \left(\frac{1}{2}\right)$

20. $\int_{-1}^2 \sin^3 x |x| dx$ is equal to

a) 0

b) 1

c) 4

d) None of these

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