

ate Planned : __ / __ / __	Daily Tutorial Sheet - 2	Expected Duration : 90 Min
Actual Date of Attempt : __ / __ / __	Level - 1	Exact Duration : _____

16. If $f(\pi) = 2$ and $\int_0^{\pi} (f(x) + f''(x)) \sin x \, dx = 5$ then $f(0)$ is equal to : (It is given that $f(x)$ is continuous in $[0, \pi]$)
- (A) 7 (B) 3 (C) 5 (D) 1
17. If $f(0) = 1$, $f(2) = 3$, $f'(2) = 5$, then $\int_0^1 x \cdot f''(2x) \, dx$ is equal to:
- (A) zero (B) 1 (C) 2 (D) None of these
18. $\int_0^{4\pi} \frac{dx}{\cos^2 x (2 + \tan^2 x)}$ is equal to:
- (A) $\pi\sqrt{2}$ (B) $2\pi\sqrt{2}$ (C) π (D) None of these
19. $\int_0^{\infty} [2e^{-x}] \, dx$, where $[.]$ denotes the greatest integer function, is equal to:
- (A) $2 \ln 4$ (B) $\ln 4$ (C) $\ln 2$ (D) None of these
20. $\int_1^4 \{x\}^{[x]} \, dx$, where $[.]$ denotes the greater integer function and $\{.\}$ denotes fraction part, is equal to:
- (A) $\frac{13}{12}$ (B) $\frac{1}{2}$ (C) $\frac{15}{12}$ (D) None of these
21. If $f(x)$ is continuous for all real values of x , then $\sum_{r=1}^n \int_0^1 f(r-1+x) \, dx$ is equal to:
- (A) $\int_0^n f(x) \, dx$ (B) $\int_0^1 f(x) \, dx$ (C) $n \int_0^1 f(x) \, dx$ (D) $(n-1) \int_1^n f(x) \, dx$
22. The value of the integral $\left| \int_0^{2\pi} [2 \sin x] \, dx \right|$ is ($[.]$ denotes the greatest integer function)
- (A) π (B) 2π (C) 3π (D) 4π
23. $\int_{-\pi/2}^{\pi/2} \frac{e^{|\sin x|} \cdot \cos x}{(1 + e^{\tan x})} \, dx$ is equal to:
- (A) $e+1$ (B) $1-e$ (C) $e-1$ (D) None of these

24. The value of $\int_0^2 [x^2 - 1] dx$, where $[x]$ denotes the greatest integer function, is given by:
 (A) $3 - \sqrt{3} - \sqrt{2}$ (B) 2 (C) 1 (D) None of these
25. If $\int_a^b \frac{x^n}{x^n + (16-x)^n} dx = 6$ then:
 (A) $a = 4, b = 12, n \in R$ (B) $a = 2, b = 14, n \in R$
 (C) $a = -4, b = 20, n \in R$ (D) $a = 2, b = 8, n \in R$
26. If for $x \neq 0$, a $f(x) + bf\left(\frac{1}{x}\right) = \frac{1}{x} - 5$ where $a \neq b$ then $\int_1^2 xf(x)dx$:
 (A) $\frac{b-9a}{9(a^2-b^2)}$ (B) $\frac{b-9a}{b(a^2-b^2)}$ (C) $\frac{b-9a}{6(a^2-b^2)}$ (D) None of these
27. Let $f(x)$ be a continuous function such that $f(a-x) + f(x) = 0$ for all $x \in [0, a]$. Then $\int_0^a \frac{dx}{1+e^{f(x)}}$ is equal to :
 (A) a (B) $\frac{a}{2}$ (C) $f(a)$ (D) $\frac{1}{2} f(a)$
28. 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 constant, gives a relation between:
 (A) a, b and c (B) a and c (C) a and b (D) b and c
29. $\int_1^3 |(2-x) \log_e x| dx$ is equal to:
 (A) $\frac{3}{2} \log_e 3 + \frac{1}{2}$ (B) $\log_e \frac{16}{3\sqrt{2}} - \frac{1}{2}$ (C) $-\frac{3}{2} \log_e 3 - \frac{1}{2}$ (D) None of these
30. $\int_0^\pi \frac{dx}{1+3^{\cos x}}$ is equal to:
 (A) π (B) 0 (C) $\frac{\pi}{2}$ (D) None of these