MATHS

BOOKS - MODERN PUBLICATION MATHS (KANNADA ENGLISH)

DEFINITE INTEGRALS

Multiple Choice Questions Level I

1. $\int_{-\pi/4}^{\pi/4} \frac{dx}{1+\cos 2x}$ is equal to

A. 1

B. 2

C. 3

D. 4

Answer: A

Watch Video Solution

2. $\int_0^{\pi/4} \sqrt{1-\sin 2x}dx$ is equal to :

A. $2\sqrt{2}$

B. $2\left(\sqrt{2}+1\right)$

C. 2

D. $\left(\sqrt{2}-1\right)$

Answer: D

Watch Video Solution

3. If $\int_0^1 \frac{e^t}{1+t}dt = a$, then $\int_0^1 \frac{e^t}{(1+t)^2}dt$ is equal to:

A. $a-1+\frac{e}{2}$

B. $a+1-\frac{e}{2}$

C. $a-1-\frac{e}{2}$

D. $a+1+\frac{e}{2}$

Answer: B

Watch Video Solution

4. Evaluate $\int_{\pi/6}^{\pi/4} \operatorname{cosec} x dx$

Watch Video Solution

5. $\int_{-1}^{1} \frac{x^3+|x|+1}{x^2+2|x|+1} dx$ is equal to :

A. log 2

B. 2 log 2

C. $\frac{1}{2}\log 2$

D. $4\log 2$

Answer: B

Watch Video Solution

6. $\int_{a+c}^{b+c} f(x)dx$ is equal to :

A. $\int_{a}^{b} f(x-c)dx$

B. $\int_{a}^{b} f(x+c)dx$

C. $\int_{a}^{b} f(x)dx$

D. $\int_{a-c}^{b-c} f(x)dx$

Answer: B

Watch Video Solution

7. $\int_{-2}^{2} |x\cos\pi x|dx$ is equal to :

A. $\frac{8}{\pi}$

B. $\frac{4}{\pi}$

C. $\frac{2}{\pi}$

D. $\frac{1}{\pi}$

Answer: A

Watch Video Solution

8. If f and g are continuous functions in $[0, 1]$ satisfying $f(x) = f(a - x)$ and $g(x) + g(a - x) = a$, then $\int_0^a f(x).\, g(x)dx$ is equal to :

A. $\frac{a}{2}$

B. $\frac{a}{2}\int_0^a f(x)dx$

C. $\int_0^a f(x)dx$

D. $a\int_0^a f(x)dx.$

Answer: B

Watch Video Solution

9. The value of $\int_x^{2\pi} [2\sin x]dx$, where [x] represents the greatest integer function, is :

A. $-\frac{5\pi}{3}$

B. $-\pi$

C. $\frac{5\pi}{3}$

D. -2π

Answer: A

Watch Video Solution

10. $I_{m,n} = \int_0^1 x^m (l_n x)^n dx$ equals:

A. $\frac{n}{n+1} I_{m, n-1}$

B. $\frac{-m}{n+1} I_{m, n-1}$

C. $\frac{-n}{m+1} I_{m, n-1}$

D. $\frac{m}{n+1} I_{m, n-1}$

Answer: C

Watch Video Solution

11. $Iim_{n \to \infty} \frac{1^{99} + 2^{99} + \ldots . + n^{99}}{n^{100}}$ equals :

A. $\frac{99}{100}$

B. $\frac{1}{100}$

C. $\frac{1}{99}$

D. $\frac{1}{101}$

Answer: B

Watch Video Solution

12. $\lim_{n \to \infty} \frac{1}{n^2} \sum_{r=1}^{n} re^{r/n}$ equals :

A. 0

B. 1

C. e

D. 2e

Answer: B

Watch Video Solution

13. If $\int_e^x tf(t)dt = \sin x - x\cos x - \frac{x^2}{2}$ for all $x \in R - [0]$, then the value of $f\left(\frac{\pi}{6}\right)$ is :

A. $-\frac{1}{2}$

B. 0

C. 2

D. $\frac{3}{2}$

Answer: A

Watch Video Solution

14. Let $f(x) = \int_1^x \sqrt{2 - t^2} dt$. Then the real roots of the equation $x^2 - f(x) = 0$ are:

A. $\pm \frac{1}{\sqrt{2}}$

B. $\pm \frac{1}{2}$

C. ± 1

D. 0 and 1.

Answer: C

Watch Video Solution

15. When $n \in N$, the value of $\int_0^n [x]dx$, where [x] is the greatest integer function, is :

A. $n(n=1)$

B. $\frac{n(n-1)}{2}$

C. $\frac{n(n+1)}{2}$

D. None of these

Answer: B

Watch Video Solution

16. If $F(x) = \int_3^x \left(2 + \frac{d}{dt}\cos t\right)dt$, then $F'\left(\frac{\pi}{6}\right)$ equals :

A. $\frac{3}{4}$

B. $\frac{1}{2}$

C. $\frac{3}{2}$

D. 2

Answer: C

Watch Video Solution

17. If f is odd function, then $\int_{-1}^{1}(|x|+f(x)\cos x)dx$ is :

A. 0

B. 1

C. 2

D. 3

Answer: B

Watch Video Solution

18. $\lim_{n\to\infty}\sum_{r=1}^{n}\frac{1}{n}\frac{\sin(r\pi)}{2\pi}$ is :

A. $\frac{2}{\pi}$

B. $\frac{\pi}{2}$

C. 2

D. None of these

Answer: A

Watch Video Solution

19. Let (a, b) and (λ, μ) be two points on the curve $y = f(x)$. If the slope of the tangent to the curve at (x, y) be $\phi(x)$, then $\int_a^\lambda \phi(x)dx$ is:

A. $\lambda - a$

B. $\mu - b$

C. $\lambda + \mu - a - b$

D. None of these

Answer: B

Watch Video Solution

20. $\int_1^{e^{17}} \frac{\pi \sin(\pi \log_e x)}{x} dx$ equals :

A. -2

B. 2

C. 2π

D. $\frac{2}{\pi}$

Answer: B

Watch Video Solution

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

A. 0

B. 1

C. 2

D. None of these

Answer: A

Watch Video Solution

22. If $f(x)$ satisfies the conditions of Rolle's Theorem on $[1, 2]$, then $\int_1^2 f'(x)dx$ equals:

A. 0

B. 1

C. 3

D. 2

Answer: A

Watch Video Solution

23. The value of the integral $\int_0^{2a} \frac{f(x)}{f(x)+f(2a-x)}$ is :

A. a

B. $-a$

C. 1

D. 0

Answer: A

Watch Video Solution

24. $\int_{-1}^{1} |x| dx$ is:

A. -1

B. 0

C. 1

D. 2

Answer: C

Watch Video Solution

25. $\int_0^{\pi/2} \frac{\sqrt{\cot x}}{\sqrt{\cot x} - \sqrt{\tan x}} dx$ is :

A. $\pi/4$

B. $\pi/2$

C. π

D. 0

Answer: A

Watch Video Solution

26. $\int_{\pi/6}^{\pi/3} \frac{dx}{1 + \sqrt{\tan x}} =$

A. $\frac{\pi}{12}$

B. $\frac{\pi}{2}$

C. $\frac{\pi}{6}$

D. $\frac{\pi}{4}$

Answer: A

Watch Video Solution

27. $\int_{-\pi}^{\pi}(1-x^2)\sin x \cdot \cos^2 x \cdot dx$ is :

A. 0

B. $\pi - \frac{\pi^3}{3}$

C. $2\pi - \pi^3$

D. $\frac{\pi}{3} - 2\pi^3$

Answer: A

Watch Video Solution

28. $\int_0^2 |x-1|dx$ is equal to :

A. -1

B. 2

C. 3

D. 1

Answer: D

Watch Video Solution

29. The value of $\int_0^1 \left(1+e^{-x^2}\right)dx$ is :

A. -1

B. 2

C. $1+\frac{1}{e}$

D. None of these

Answer: D

Watch Video Solution

30. Let $f: R \to R$ and $g: R \to R$ be continuous functions. Then the value of :

$\int_{-\pi/2}^{\pi/2} [f(x) + f(-x)][g(x) - g(-x)]dx$ is :

A. π

B. 1

C. -1

D. 0

Answer: D

Watch Video Solution

31. $\int_0^{\pi/2} |\sin x - \cos x| dx$ is equal to

A. 0

B. $2\left(\sqrt{2}-1\right)$

C. $\sqrt{2}-1$

D. $2\left(\sqrt{2}+1\right)$

Answer: B

Watch Video Solution

32. $\int_0^1 \frac{dx}{\left(x^2+1\right)^{3/2}} dx$ is equal to :

A. $\frac{1}{2}$

B. $\frac{1}{\sqrt{2}}$

C. 1

D. $\sqrt{2}$

Answer: B

Watch Video Solution

Watch Video Solution

33. $\int_{-1}^{1} \frac{|x+2|}{x+2} dx$ is :

A. 1

B. 2

C. 0

D. -1

Answer: B

Watch Video Solution

34. The value of the integral $\int_{-\pi}^{\pi} \sin mx \sin nx dx$, for $m \neq n (m, n \in 1)$ is :

A. 0

B. π

C. $\pi/2$

D. 2π

Answer: A

Watch Video Solution

35. The value of $\int_{-\pi}^{\pi} \sin^3 x \cdot \cos^2 x dx$ is :

A. 0

B. $\frac{\pi^4}{4}$

C. $\frac{\pi^4}{2}$

D. None of these

Answer: A

Watch Video Solution

36. If $\int_0^1 f(x)dx = 1, \int_0^1 xf(x)dx = a, \int_0^1 x^2 f(x)dx = a^2,$ then $\int_0^1 (a-x)^2 f(x)dx$ is equal to :

A. 0

B. $2a^2$

C. $4a^2$

D. None of these

Answer: A

Watch Video Solution

37. $\int_{-1}^{2} x|x|dx$ is equal to :

A. 3

B. $7/3$

C. $\int_{-1}^{2} x^2 dx$

D. None of these

Answer: A

Watch Video Solution

38. $\lim_{n \to \infty} \frac{\sqrt{1} + \sqrt{2} + \ldots\ldots + \sqrt{n}}{n^{3/2}}$ equals :

A. 0

B. $2/3$

C. 1

D. $3/2$

Answer: B

Watch Video Solution

39. $\int_a^b \frac{\log x}{x} dx$ is :

A. $\log ab \log\left(\frac{b}{a}\right)$

B. $\log(a+b)\log ab$

C. $\frac{1}{2}\log ab \log\left(\frac{b}{a}\right)$

D. None of these

Answer: C

Watch Video Solution

40. $\int_0^2 \left[x^2\right] dx =$

A. 3

B. $8/3$

C. $5-\sqrt{2}-\sqrt{3}$

D. None of these

Answer: C

Watch Video Solution

41. $\int_1^2 \frac{(\cos)(\log x)}{x} dx$ is :

A. $\sin(\log 2)$

B. $\cos(\log 3)$

C. $\pi/4$

D. 1

Answer: A

Watch Video Solution

42. If $\frac{d}{dx} f(x) = g(x)$, then $\int_a^b f(x)g(x)dx$ is:

A. $\frac{1}{2}\left[[g(b)]^2 - [g(a)]^2\right]$

B. $\frac{1}{2}\left[[f(b)]^2 - [f(a)]^2\right]$

C. 0

D. None of these

Answer: B

Watch Video Solution

43. $\int_0^{\pi/2} \frac{1}{1+(\cot x)^3} dx$ is:

A. π

B. $\pi/2$

C. $\pi/4$

D. $3\pi/2$

Answer: C

Watch Video Solution

44. Let f be a function continuous on R, then $\int_{-\pi/2}^{\pi/2}(x+\sin x)\{f(x)+f(-x)\}dx$ is :

A. 0

B. $\pi+2$

C. π

D. None of these

Answer: A

View Text Solution

45. $\int_{1}^{\sqrt{3}}\frac{dx}{\sqrt{4-x^2}}$ is :

A. $\pi/2$

B. $\pi/3$

C. $\pi/6$

D. $\pi/4$

Answer: C

Watch Video Solution

46. $\int_0^{2\pi} \sqrt{1+\sin\left(\frac{x}{2}\right)}dx$ is :

A. 8

B. 4

C. 2

D. 0

Answer: A

Watch Video Solution

47. $\int_0^2 x^2\left[\frac{x}{2}\right]dx$ is :

A. 2

B. 1

C. $1/2$

D. None of these

Answer: A

Watch Video Solution

48. If $\int_0^1 \frac{dx}{\sqrt{1+x}-\sqrt{x}} = \frac{k\sqrt{2}}{3}$, then k is :

A. 1

B. 2

C. 3

D. 4

Answer: D

Watch Video Solution

49. $\int_0^{\pi/2} \log(\tan x)dx$ is :

A. $\int_0^{\pi/2} \log \cot x dx$

B. $\frac{-\pi}{2}\log 2$

C. $\frac{\pi}{2}\log 2$

D. 0

Answer: D

Watch Video Solution

50. $\int_0^{\pi/2} \frac{\sin x + \cos x}{\sqrt{1+\sin 2x}}dx$ is :

A. $\frac{\pi}{2}$ or $-\frac{\pi}{2}$

B. $\frac{\pi}{2}$

C. $-\frac{\pi}{2}$

D. None of these

Answer: B

Watch Video Solution

51. $\int_{-\pi/2}^{\pi/2} \sin^2 x \log\left(\frac{2-\sin x}{2+\sin x}\right) dx$ is :

A. 1

B. 2

C. 0

D. None of these

Answer: C

View Text Solution

52. Let $I = \int_1^2 \frac{dx}{\sqrt{1+x^2}}, J = \int_1^2 \frac{dx}{x}$, then

A. $I = J$

B. $I < J$

C. $I > J$

D. None of these

Answer: B

Watch Video Solution

53. $\int_0^{1.5} [x^2] dx$ is :

A. $\sqrt{2}$

B. $2 - \sqrt{2}$

C. $2 + \sqrt{2}$

D. None of these

Answer: B

Watch Video Solution

54. $\int_0^1 \log\left(\frac{1}{x}-1\right)dx$ is :

A. 1

B. 0

C. log 2

D. None of these

Answer: B

Watch Video Solution

55. If $f(x)=\int_0^x t\sin t dt,$ then f'(x) is

A. $\sin x$

B. $x\sin x$

C. $x\cos x$

D. None of these

Answer: B

Watch Video Solution

56. $\int_0^2 \left[\frac{x}{2}\right] dx$ is :

A. 2

B. 1

C. 0

D. -1

Answer: C

Watch Video Solution

57. If $f(x)$ satisfiles requirements of Rolle's theorem in $[1, 2]$ and $f(x)$ is continuous in [1,2], then $\int_1^2 f'(x)dx$ is :

A. 1

B. 2

C. 0

D. None of these

Answer: C

Watch Video Solution

58. $\lim_{n \to \infty} \frac{\sqrt{1} + 2\sqrt{2} + 3\sqrt{3} + \ldots\ldots + n\sqrt{n}}{n^{5/2}}$ is :

A. $\int_0^1 x\sqrt{x}dx$

B. 0

C. 1

D. None of these

Answer: A

Watch Video Solution

59. $\int_0^{\pi/2} \cos x e^{\sin x} dx$ is :

A. 0

B. 1

C. -1

D. $e - 1$

Answer: D

Watch Video Solution

60. If $g''(x)$ is continuous for all $x, g(0) = g'(1) = 1$ and if $\int_0^1 xg''(x)dx$ vanishes, then g(1) is:

A. 1

B. 2

C. 3

D. -2

Answer: B

View Text Solution

61. The function $L(x) = \int_1^x \frac{dt}{t}$ satisfies the equation:

A. $L(x+y) = L(x) + L(y)$

B. $L\left(\frac{x}{y}\right) = L(x) + L(Y)$

C. $L(xy) = L(x) + L(y)$

D. None of these

Answer: C

Watch Video Solution

62. $\int_{-1}^{1} |1-x| dx$ is :

A. -2

B. 0

C. 2

D. 4

Answer: C

Watch Video Solution

63. $\int_{2}^{4} \frac{dx}{\sqrt{(x-2)(4-x)}}$ is equal to :

A. 0

B. $\pi/2$

C. π

D. None of these

Answer: C

View Text Solution

64. $\int_0^{2\pi} \theta \sin^2\theta \cos\theta d\theta$ is equal to :

A. 0

B. $\frac{16\pi}{3}$

C. $\frac{\pi}{16}$

D. $\frac{3\pi}{16}$

Answer: A

Watch Video Solution

65. The value of $\int_{-1}^{1}\left(2|x|-|x|^{3}\right)dx$ is :

A. 3

B. $\frac{3}{2}$

C. 0

D. $\frac{3}{4}$

Answer: B

Watch Video Solution

66. The value of integral $\int_{-\pi/4}^{\pi/4}\sin^{-4}xdx$ is :

A. $8/3$

B. $-8/3$

C. $3/2$

D. None of these

Answer: B

Watch Video Solution

67. The function $F(x) = \int_0^x \log\left(\frac{1-x}{1+x}\right)dx$ is :

A. a periodic function

B. an odd function

C. an even function

D. None of these

Answer: C

Watch Video Solution

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

A. 0

B. π

C. $-\pi$

D. $1/x$

Answer: D

Watch Video Solution

69. The critical point of :

$f(x) = 1 + x + \int_1^x \left[(\log t)^2 + 2\log t\right] dt$ is :

A. $\frac{1}{e}$

B. $\frac{\pi}{2}$

C. $\frac{\pi}{3}$

D. $\frac{\pi}{6}$

Answer: A

Watch Video Solution

70. $\int_0^{\pi/2} \frac{3^{\sin x}}{3^{\sin x}+3^{\cos x}}dx$ equals :

A. 2

B. $\frac{\pi}{4}$

C. $\frac{\pi}{2}$

D. π

Answer: B

Watch Video Solution

71. If $a < 0 < b$, then $\int_a^b \frac{|x|}{x}dx$ equals :

A. $a - b$

B. $a + b$

C. $b - a$

D. $-a - b$

Answer: B

Watch Video Solution

72. $\int \left[\log(\log x) + (\log x)^{-2}\right] dx$ is :

A. $x \log(\log x)$

B. $x \log(\log x) + x / (\log x)$

C. $x \log(\log x) - \frac{x}{\log x}$

D. None of these

Answer: C

Watch Video Solution

73. The value of integral $\int_0^\infty \frac{x \log x}{(1+x^2)^2} dx$ is :

A. 1

B. 0

C. 2

D. None of these

Answer: B

Watch Video Solution

74. 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. $\frac{g(x)}{g(\pi)}$

Answer: A

Watch Video Solution

75. $\int_0^1 \tan^{-1}\left(1-x+x^2\right)dx$ equals :

A. $\log 2$

B. $\frac{\log 1}{2}$

C. $\pi \log 2$

D. $\frac{\pi}{2}\frac{\log 1}{2}$

Answer: A

Watch Video Solution

76. $\int_{\pi/4}^{3\pi/4} \frac{dx}{1+\cos x}$ is equal to :

A. 2

B. -2

C. $1/2$

D. $-1/2$

Answer: A

Watch Video Solution

77. $\int_{\pi}^{10\pi} |\sin x| dx$ is :

A. 20

B. 8

C. 10

D. 18

Answer: D

Watch Video Solution

78. $\int_{-\pi}^{\pi} \frac{2x(1+\sin x)}{1+\cos^2 x} dx$ is :

A. $\frac{\pi^2}{4}$

B. π^2

C. zero

D. $\frac{\pi}{2}$

Answer: B

Watch Video Solution

79. $\int_0^{\pi/2} \frac{\sqrt{\sin x}}{\sqrt{\sin x}+\sqrt{\cos x}} dx$ equals:

A. $\frac{\pi}{4}$

B. $\frac{\pi}{2}$

C. zero

D. 1

Answer: A

Watch Video Solution

80. If $I_n = \int_0^{\pi/4} \tan^n x dx$, then $\lim_{n \to \infty} n[I_n + I_{n-2}]$ equals :

A. $\frac{1}{2}$

B. 1

C. ∞

D. zero

Answer: B

Watch Video Solution

81. If $f(a+b-x) = fx$, then $\int_a^b x f(x) dx$ is equal to :

A. $\frac{a+b}{2} \int_0^b f(x) dx$

B. $\frac{b-a}{2}\int_a^b f(x)dx$

C. $\frac{a+b}{2}\int_a^b f(a+b-x)dx$

D. $\frac{a+b}{2}\int_a^b f(b-x)dx$

Answer: A

Watch Video Solution

82. The value of the integral $I = \int_0^1 x(1-x)^n dx$ is :

A. $\frac{1}{n+2}$

B. $\frac{1}{n+1} - \frac{1}{n+2}$

C. $\frac{1}{n+1} + \frac{1}{n+2}$

D. $\frac{1}{n+1}$

Answer: B

Watch Video Solution

83. If $\int_0^{\pi} x f(\sin x)dx = A\int_0^{\pi/2} f(\sin x)dx$, then A is :

A. 0

B. π

C. $\frac{\pi}{4}$

D. 2π

Answer: B

Watch Video Solution

84. The value of $\int_{-2}^{3} |1 - x^2|dx$ is:

A. $\frac{28}{3}$

B. $\frac{14}{3}$

C. $\frac{7}{3}$

D. $\frac{1}{3}$

Answer: A

Watch Video Solution

85. The value of $I = \int_0^{\pi/2} \frac{(\sin x + \cos x)^2}{\sqrt{1 + \sin 2x}} dx$ is :

A. 0

B. 1

C. 2

D. 3

Answer: C

Watch Video Solution

86. $\lim_{n \to \infty} \sum_{r=1}^{n} \frac{1}{n} e^{\frac{r}{n}}$ is :

A. e

B. $e - 1$

C. $1 - e$

D. $e + 1$

Answer: B

Watch Video Solution

87. The value of $\int_{-\pi}^{\pi} \frac{\cos^2 x}{1 + a^x} dx, a > 0$, is :

A. $\frac{\pi}{2}$

B. $a\pi$

C. 2π

D. $\frac{\pi}{a}$

Answer: A

Watch Video Solution

88. The value of the integral, $\int_3^6 \frac{\sqrt{x}}{\sqrt{9-x}+\sqrt{x}}dx$ is :

A. $1/2$

B. $3/2$

C. 2

D. 1

Answer: B

Watch Video Solution

89. $\int_0^{\pi} x f(\sin x)dx$ is equal to :

A. $\pi\int_0^{\pi/2} x f(\cos x)dx$

B. $\pi\int_0^{\pi} f(\sin x)dx$

C. $\frac{\pi}{2}\int_0^{\pi/2} f(\sin x)dx$

D. $\pi\int_0^{\pi/2} f(\cos x)dx$

Answer: D

Watch Video Solution

90. $\int_{-3\pi/2}^{-\pi/2}\left[(x+\pi)^3+\cos^2(x+3\pi)\right]dx$ is equal to :

A. $\frac{PI^4}{32}$

B. $\frac{\pi^4}{32}+\frac{\pi}{2}$

C. $\frac{\pi}{2}$

D. $\frac{\pi}{2}-1$

Answer: C

Watch Video Solution

Multiple Choice Questions Level Ii

1. Let $f(x) = x - [x]$, for every real number x, where [x] is integral part of x. Then $\int_{-1}^{1} f(x)dx$ is:

A. 1

B. 2

C. 0

D. $\frac{1}{2}$

Answer: A

Watch Video Solution

2. If $\int_{0}^{x} f(t)dt = x + \int_{x}^{l} tf(t)dt$, then the value of $f(1)$ is :

A. $\frac{1}{2}$

B. 0

C. 1

D. $-\frac{1}{2}$

Answer: A

Watch Video Solution

3. If $f(x) = A\sin\left(\frac{\pi x}{2}\right) + B, f'\left(\frac{1}{2}\right) = \sqrt{2}$ and $\int_0^1 f(x)dx = \frac{2A}{\pi}$, then the constants A and B are respectively :

A. $\frac{\pi}{2}$ and $\frac{\pi}{2}$

B. $\frac{2}{\pi}$ and $\frac{3}{\pi}$

C. 0 and $\frac{-4}{\pi}$

D. $\frac{4}{\pi}$ and 0

Answer: D

Watch Video Solution

4. $\int_{-1}^{1}\left(\frac{x^7-3x^5+7x^3-x}{\cos^2 x}+\cos^{-1}x\right)dx$ equals :

A. 0

B. $\frac{\pi}{2}$

C. π

D. 2π

Answer: C

View Text Solution

5. $\sum_{n=1}^{1000}\int_{n-1}^{n} e^{x-[x]}dx$, whose [x] is the greatest integer function, is :

A. $1000(e-1)$

B. $\frac{e-1}{1000}$

C. $\frac{e^{1000}-1}{1000}$

D. $\frac{e^{1000}-1}{e-1}$

Answer: A

Watch Video Solution

6. If $f(x) = \begin{vmatrix} \sin x + \sin 2x + \sin 3x & \sin 2x & \sin 3x \\ 3 + 4\sin x & 3 & 4\sin x \\ 1 + \sin x & \sin x & 1 \end{vmatrix}$ then the value of $\int_0^{-\pi/2} f(x)dx$ equals :

A. 0

B. $\frac{1}{3}$

C. $\frac{2}{3}$

D. 3

Answer: B

Watch Video Solution

7. $\lim_{n \to \infty} \left\{ \frac{n!}{(kn)^n} \right\}^{\frac{1}{n}}$, where $k \neq 0$ is a constant and $n \in N$, equals :

A. ke

B. ke^{-1}

C. $k^{-1}e$

D. $k^{-1}e^{-1}$

Answer: D

Watch Video Solution

8. If $f(x)$ is a quadratic polynomial such that $f(0) = 2, f(0) = -3$ and $f'(0) = 4$, then $\int_{-1}^{1} f(x)dx$ equals:

A. -3

B. $\frac{16}{3}$

C. 0

D. None of these

Answer: B

Watch Video Solution

9. $\lim_{n \to \infty} \left(\frac{n}{1+n^2} + \frac{n}{2^2+n^2} + \frac{n}{3^2+n^2} + \ldots\ldots + \frac{n}{n^2+n^2} \right)$ is :

A. $\pi/4$

B. $\log 2$

C. 0

D. 1

Answer: A

Watch Video Solution

10. $\int_0^{\pi} \frac{x \tan x dx}{\sec x + \cos x} =$

A. $\pi^2/4$

B. $\pi^2/2$

C. $3\pi^2/2$

D. $\pi^2/3$

Answer: A

Watch Video Solution

11. Let $f: R \to R$ be a differentiable function and $f(1) = 4$, then the value of $\lim_{x \to 1} \int_4^{f(x)} \frac{2t}{x-1} dt$ is :

A. $8f'(1)$

B. $4'f(1)$

C. $2f'(1)$

D. $f'(1)$

Answer: A

Watch Video Solution

12. For any integer n, the integral : $\int_0^{\pi} e^{\cos^2} \cos^3(2n+1)x dx$ has the value :

A. π

B. 1

C. 0

D. None of these

Answer: C

Watch Video Solution

13. If $I_n = \int_0^{\pi/4} \tan^n \theta d\theta$, then for any +ve integer n, the value of $n(I_{n-1} + I_{n+1})$ is :

A. 1

B. 2

C. $\pi/4$

D. π

Answer: A

Watch Video Solution

14. $\int_0^1 |\sin 2\pi x| dx$ is equal to :

A. 0

B. $\frac{-1}{\pi}$

C. $\frac{1}{\pi}$

D. $\frac{2}{\pi}$

Answer: D

Watch Video Solution

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

A. $a\int_0^a f(x)dx$

B. $\frac{a^2}{2}\int_0^a f(x)dx$

C. $\frac{a}{2}\int_0^a f(x)dx$

D. $-\frac{a}{2}\int_0^a f(x)dx.$

Answer: C

Watch Video Solution

16. Let $f(x) = \begin{cases} e^{\cos x}\sin x, & \text{for} |x| \leq 2 \\ 2 & \text{otherwise} \end{cases}$ then : $\int_{-2}^{3} f(x)dx$ = ...

A. 0

B. 1

C. 2

D. 3

Answer: C

Watch Video Solution

17. The value of integral $\int_{e^{-1}}^{e^2} \left| \frac{\log_e x}{x} \right| dx$ is :

A. $3/2$

B. $5/2$

C. 3

D. 5

Answer: B

Watch Video Solution

18. Let $g(x) = \int_0^x f(t)dt,$ where $\frac{1}{2} \leq f(t) < 1, t \in [0, 1]$ and $0 < f(t) \leq \frac{1}{2}$ for $t \in [1, 2]$. Then :

A. $-\frac{3}{2} \leq g(2) < \frac{1}{2}$

B. $0 \leq g(2) < 2$

C. $\frac{3}{2} < g(2) \leq \frac{5}{2}$

D. $2 < g(x) < 4$

Answer: B

Watch Video Solution

19. Let $f: (0, \infty) \to R$ and $F(x) = \int_0^x f(t)dt.$

If $F\left(x^2\right) = x^2(1 + x)$, then $f(4)$ equals :

A. $\frac{5}{4}$

B. 7

C. 4

D. 2

Answer: C

Watch Video Solution

20. If $\frac{1 \sin t}{1+t} dt = \alpha$, then that value of the integral : $\int_{4\pi-2}^{4\pi} \frac{\frac{\sin t}{2}}{4\pi+2-t} dt$ in terms of α is given by :

A. 2α

B. -2α

C. α

D. $-\alpha$

Answer: D

Watch Video Solution

21. The integral $\int_{-1/2}^{1/2} \left([x] + l_n \left(\frac{1+x}{1-x} \right) \right) dx$ equals :

A. $-\frac{1}{2}$

B. 0

C. 1

D. $2l_n\left(\frac{1}{2}\right)$

Answer: A

Watch Video Solution

22. Let $f(x) = \int_1^x \sqrt{2-t^2}dt$. Then the real roots of the equation $x^2 - f'(x) = 0$ are :

A. ± 1

B. $\pm \frac{1}{\sqrt{2}}$

C. $\pm \frac{1}{2}$

D. 0 and 1

Answer: A

Watch Video Solution

23. Let T > 0 be a fixed real number. Suppose f is a continuous function such that for all $x \in Rf(x+T) = f(x)$. If $I = \int_6^T f(x)dx$, then the value of $\int_3^{3+3T} f(2x)dx$ is:

A. $\frac{3}{2}I$

B. $2I$

C. $3I$

D. $6I$

Answer: C

Watch Video Solution

24. Let $\frac{d}{dx}F(x) = \left(\frac{e^{\sin x}}{x}\right), x > 0$. 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. 16

B. 63

C. 64

D. 15

Answer: C

Watch Video Solution

25. If $f(y) = e^y, g(y) = y, y > 0$ and $F(t) = \int_0^t f(t-y)g(y)dy$, then

A. $F(t) = e^t - (1+t)$

B. $F(t)te^t$

C. $F(t) = te^{-1}$

D. $F(t) = 1 - e^t(1+t)$

Answer: A

Watch Video Solution

26. 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. $e + \frac{e^2}{2} - \frac{3}{2}$

B. $e - \frac{e^2}{2} - \frac{3}{2}$

C. $e + \frac{e^2}{2} + \frac{5}{2}$

D. $e - \frac{e^2}{2} - \frac{5}{2}$

Answer: B

Watch Video Solution

27. If $f(x) = \int_{x^2}^{x^2+1} e^{-t^2} dt$, find the interval in which f(x) is increasing :

A. $(0, \infty)$

B. $(-\infty, 0)$

C. $(-2, 2)$

D. No where

Answer: B

Watch Video Solution

28. If $f(x) = \frac{e^x}{1+e^x}, I_1 = \int_{f(-a)}^{f(a)} xg\{x(1-x)\}dx$ and $I_2 = \int_{f(-a)}^{f(a)} g\{x(1-x$, then $\frac{I_2}{I_1}$ is :

A. 2

B. -3

C. -1

D. 1

Answer: A

Watch Video Solution

29. The value of the integral $\int_0^1 \sqrt{\frac{1-x}{1+x}}dx$ is :

A. $\frac{\pi}{2}+1$

B. $\frac{\pi}{2}-1$

C. -1

D. 1

Answer: B

Watch Video Solution

30. If $I_1=\int_0^1 2^{x^2}dx, I_2=\int_0^1 2^{x^3}dx, I_3=\int_1^2 2^{x^2}dx, I_4=\int_1^2 2^{x^3}dx$ then,

A. $I_1 > I_2$

B. $I_2 > I_1$

C. $I_3 > I_4$

D. $I_3 = I_4$

Answer: A

Watch Video Solution

31. Let $F: R \to R$ be a differentiable function having : $f(2) = 6, f'(2) = \frac{1}{48}$

Then $\lim_{x \to 2} \int_6^{f(x)} \frac{4t^3}{x-2} dt$ equals :

A. 36

B. 24

C. 18

D. 12

Answer: C

Watch Video Solution

32. $\lim_{n \to \infty} \left[\frac{1}{n^2} \sec^2 \frac{1}{n^2} + \frac{2}{n^2} \sec^2 \frac{4}{n^2} + \ldots\ldots + \frac{1}{n} \sec^2 1 \right]$ equals :

A. $\frac{1}{2}\text{cosec}1$

B. $\frac{1}{2}\sec 1$

C. $\frac{1}{2}\tan 1$

D. $\tan 1$

Answer: C

Watch Video Solution

33. Let $F(x) = f(x) + f\left(\frac{1}{x}\right)$, where , $f(x) = \int_1^x \frac{\log t}{1+t} dt$. Then $F(e)$ equals :

A. 0

B. 1

C. z

D. $\frac{1}{2}$

Answer: D

Watch Video Solution

34. The solution for x of the equation : $\int_{\sqrt{2}}^{x} \frac{dt}{t\sqrt{t^2-1}} = \frac{\pi}{2}$ is :

A. $\pi/2$

B. $\frac{\sqrt{3}}{2}$

C. $2\sqrt{2}$

D. None of these

Answer: D

Watch Video Solution

35. Let $I = \int_0^1 \frac{\sin x}{\sqrt{x}} dx$ and $J = \int_0^1 \frac{\cos x}{\sqrt{x}} dx$. Then which 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 $J > 2$

Answer: C

Watch Video Solution

36. If $I(m, n) = \int_0^1 t^m (1+t)^n dt, m, n \in R$, then $I(m, n)$ is :

A. $\frac{n}{1+m} I \begin{bmatrix} m+1 \\ n-1 \end{bmatrix}$

B. $\frac{m}{n+1} I \begin{bmatrix} m+1 \\ n-1 \end{bmatrix}$

C. $\frac{2^n}{1+m} - m(1+m) I \begin{bmatrix} m+1 \\ n-1 \end{bmatrix}$

D. $\frac{2^n}{1+m} - \frac{n}{1+m} I \begin{bmatrix} m+1 \\ n-1 \end{bmatrix}$

Answer: D

Watch Video Solution

37. If $f(x)$ is differentiable and $\int_0^{t^2} xf(x)dx = \frac{2}{5}t^5$, then $f\left(\frac{4}{25}\right)$ equals :

A. $\frac{2}{5}$

B. $\frac{-5}{2}$

C. 1

D. $\frac{5}{2}$

Answer: A

Watch Video Solution

38. $\int_{-2}^{0} \{x^3 + 3x^2 + 3x + 3 + (x+1)\cos(x+1)\}dx$ is equal to :

A. 4

B. 2

C. 0

D. 1

Answer: A

Watch Video Solution

39. If $\int_{\sin x}^{1} t^2 f(t)dt = 1 - \sin x$, then the value of $f\left(\frac{1}{\sqrt{3}}\right)$ is :

A. $\frac{1}{\sqrt{3}}$

B. $\frac{1}{3}$

C. $\sqrt{3}$

D. 3

Answer: D

Watch Video Solution

40. The value of $\int_I^a [x]f'(x)dx, a > 1$, where [x] denotes the greatest integer not exceeding x is :

A. $af(a) - \{f(1) + f(2) + \ldots\ldots + f([a])\}$

B. $[a]f(a) - \{f(1) + f(2) + \ldots\ldots + f([a])\}$

C. $[a]f([a]) - \{f(1) + f(2) + \ldots\ldots + f([a])\}$

D. $af([a]) - \{f(1) + f(2) + \ldots\ldots + f([a])\}$

Answer: B

View Text Solution

41. $\int_0^\pi [\cot x]dx$, when $[\cdot]$ denotes the greatest integer function, is equal to :

A. $\frac{\pi}{2}$

B. 1

C. -1

D. $-\frac{\pi}{2}$

Answer: D

Watch Video Solution

42. Let 'f' be a non-negative function defined on the interval [0,1].

If $\int_0^x \sqrt{1-(f'(t))^2}dt = \int_0^x f(t)dt, 0 \leq x \leq 1$ and f(0) = 0, then :

A. $f\left(\frac{1}{2}\right) < \frac{1}{2}$ and $f\left(\frac{1}{3}\right) > \frac{1}{3}$

B. $f\left(\frac{1}{2}\right) > \frac{1}{2}$ and $f\left(\frac{1}{3}\right) > \frac{1}{3}$

C. $f\left(\frac{1}{2}\right) < \frac{1}{2}$ and $f\left(\frac{1}{3}\right) < \frac{1}{3}$

D. $f\left(\frac{1}{2}\right) > \frac{1}{2}$ and $f\left(\frac{1}{3}\right) < \frac{1}{3}$

Answer: C

Watch Video Solution

Latest Questions From Aieee Jee Examination

1. Let p(x) be a function defined on R such that $p'(x) = p'(1-x)$, for all $x \in [0,1], p(0) = 1$ and $p(1) = 41$.

Then $\int_0^1 p(x)dx$ equals :

A. $\sqrt{41}$

B. 21

C. 41

D. 42

Answer: B

Watch Video Solution

2. The value(s) of $\int_0^1 \frac{x^4(1-x)^4}{1+x^2}dx$ is (are) :

A. $\frac{22}{7} - \pi$

B. $\frac{2}{105}$

C. 0

D. $\frac{71}{15} - \frac{3\pi}{2}$.

Answer: A

Watch Video Solution

3. Let f be a real valued function defined on the interval $(-1, 1)$ such that $e^{-x} f(x) = 2 + \int_0^x \sqrt{t^4 + 1} dt$, for all $x \in (-1, 0)$ and let f^{-1} be the inverse function of f. Then $\left(f^{-1}\right)'(2)$ is equal to :

A. 1

B. $\frac{1}{3}$

C. $\frac{1}{2}$

D. $\frac{1}{e}$

Answer: B

Watch Video Solution

4. The value of $\int_0^1 \frac{8\log(1+x)}{1+x^2}dx$ is:

A. $\pi \log 2$

B. $\frac{\pi}{6}\log 2$

C. $\frac{\pi}{2}\log 2$

D. $\log 2$

Answer: A

Watch Video Solution

5. For $x \in 0, \left(5\frac{\pi}{2}\right)$, define $f(x) = \int_0^x \sqrt{t}\sin t dt$. Then f has :

A. local maximum at π and 2π

B. local minimum at π and 2π

C. local minimum at π and local maximum at 2π

D. local maximum at π and local mininum at 2π

Answer: D

Watch Video Solution

6. The value of $\int_{\sqrt{\ln 2}}^{\sqrt{\ln 3}} \frac{x \sin x^2}{\sin x^2 + \sin(\ln 6 - x^2)} dx$ is :

A. $\frac{1}{4}\ln\left(\frac{3}{2}\right)$

B. $\frac{1}{2}\ln\left(\frac{3}{2}\right)$

C. $\ln\left(\frac{3}{2}\right)$

D. $\frac{1}{6}\ln\left(\frac{3}{2}\right)$

Answer: A

Watch Video Solution

7. Let $[\cdot]$ denote the greatest integer function, then the value of $\int_0^{1.5} x\left[x^2\right] dx$ is :

A. 0

B. $\frac{3}{2}$

C. $\frac{3}{4}$

D. $\frac{5}{4}$

Answer: C

Watch Video Solution

8. If $g(x) = \int_0^x \cos 4t dt,$ then $g(x+\pi)$ equals :

A. $\frac{g(x)}{g(\pi)}$

B. $g(x) + g(\pi)$

C. $g(x) - g(\pi)$

D. $g(x) \cdot g(\pi)$

Answer: B::C

Watch Video Solution

9. The value of the integral $\int_{-\pi/2}^{\pi/2}\left(x^2+l_n\frac{\pi+x}{\pi-x}\right)\cos x dx$ is :

A. 0

B. $\frac{\pi^2}{2}-4$

C. $\frac{\pi}{2}+4$

D. $\frac{\pi^2}{2}$

Answer: B

Watch Video Solution

10. The intercepts on x-axis made by tangents to the curve, $y=\int_0^x |t|dt, x\in R$, Which are parallel to the line $y=2x$ are equal to :

A. ± 2

B. ± 3

C. ± 4

D. ± 1

Answer: D

Watch Video Solution

11. Let $f: \left[\frac{1}{2}, 1\right] \to R$ (the set of all real numbers) be a positive, non - constant and differentiable function such that the $f'(x) < 2f(x)$ and $f\left(\frac{1}{2}\right) = 1$. Then the value of $\int_{1/2}^{1} f(x)dx$ lies in the interval :

A. $(2e - 1, 2e)$

B. $(e - 1, 2e - 1)$

C. $\left(\frac{e-1}{2}, e - 1\right)$

D. $\left(0, \frac{e-1}{2}\right)$

Answer: D

View Text Solution

12. The integral $\int_0^{\pi} \sqrt{1+4\frac{\sin^2 x}{2}-4\frac{\sin x}{2}}dx$ equals :

A. $\frac{2\pi}{3}-4-4\sqrt{3}$

B. $4\sqrt{3}-4$

C. $4\sqrt{3}-4-\frac{\pi}{3}$

D. $\pi-4$

Answer: C

Watch Video Solution

13. The integral $\int_2^4 \frac{\log x^2}{\log x^2+\log(36-12x+x^2)}dx$ is equal to :

A. 2

B. 4

C. 1

D. 6

Answer: C

Watch Video Solution

Recent Competitive Questions

1. The value of the integral $\int_0^{\pi/2} \left(\sin^{100} x - \cos^{100} x\right) dx$ is :

A. $\frac{100!}{(100)^{10}}$

B. $\frac{1}{100}$

C. 0

D. $\frac{\pi}{100}$

Answer: C

Watch Video Solution

2. If [x] denote the greatest integer function , then , $\int_0^{\pi/6} \frac{1-\cos 2x}{1+\cos 2x} d(x-[x]) =$

A. $\frac{1}{\sqrt{3}} + \frac{\pi}{6}$

B. $\frac{1}{\sqrt{3}} - \frac{\pi}{6}$

C. $\sqrt{3} - \frac{\pi}{6}$

D. $\sqrt{3} + \frac{\pi}{6}$

Answer: B

Watch Video Solution

3. If $[x]$ denotes the greatest integer function, then :

$\int_2^4 ([x]-1)([x]-2)([x]-3)([x]-4)dx$ =

A. 0

B. 3

C. 6

D. $\frac{1}{6}$

Answer: A

Watch Video Solution

4. $\int_1^{e^{17/2}} \frac{\cos(\pi \log x)}{x} dx =$

A. 0

B. -1

C. 2

D. 1

Answer: D

Watch Video Solution

5. $\int_0^1 x(1-x)^{3/2}dx =$

A. $-\frac{8}{25}$

B. $\frac{24}{35}$

C. $\frac{4}{35}$

D. $-\frac{2}{35}$

Answer: C

Watch Video Solution

6. $\int_0^{\pi/4} \frac{\sin x + \cos x}{3 + \sin 2x}dx =$

A. $2\log 3$

B. $\frac{1}{2}\log 3$

C. $\log 3$

D. $\frac{1}{4}\log 3.$

Answer: D

Watch Video Solution

7. $\int_0^1 (x^4 + 2x^2 + 1) d(x^2 + 1) =$

A. $\frac{5}{3}$

B. $\frac{7}{3}$

C. $\frac{1}{3}$

D. $\frac{28}{15}$

Answer: B

Watch Video Solution

8. If $I_1 = \int_0^{\pi/2}$ x sin x dx and $I_2 = \int_0^{\pi/2}$ x cos x dx, then which one of the following is true ?

A. $I_1 = I_2$

B. $I_1 + I_2 = 0$

C. $I_1 = \frac{\pi}{2} I_2$

D. $I_1 + I_2 = \frac{\pi}{2}$

Answer: D

Watch Video Solution

9. The value of $\int_{-1}^{2} \frac{|x|}{x} dx$ is :

A. 0

B. 1

C. 2

D. 3

Answer: B

Watch Video Solution

10. $\int_0^{\pi} \frac{\cos^4 x}{\cos^4 x + \sin^4 x} dx =$

A. $\frac{\pi}{4}$

B. $\frac{\pi}{2}$

C. $\frac{\pi}{8}$

D. π

Answer: B

Watch Video Solution

11. If $f(x) = f(\pi + e - x)$ and $\int_e^{\pi} f(x)dx = \frac{2}{e+\pi}$, then $\int_e^{\pi} xf(x)dx$ is equal to

A. $\frac{\pi + e}{2}$

B. $\frac{\pi - e}{2}$

C. $\pi - e$

D. 1

Answer: D

Watch Video Solution

12. The value of the integral

$\int_{-\pi/4}^{\pi/4} \log(\sec\theta - \tan\theta)d\theta$ is

A. $\frac{\pi}{4}$

B. $\frac{\pi}{2}$

C. 0

D. π

Answer: C

Watch Video Solution

13. The interval I such that $\int_0^1 \frac{dx}{\sqrt{1+x^4}} \in I$ is given by :

A. $\left(0, \frac{1}{\sqrt{2}}\right)$

B. $\left[\frac{1}{\sqrt{2}}, 1\right]$

C. $(\sqrt{2}, 2)$

D. $\left[\sqrt{2}, \frac{7}{4}\right]$

Answer: B

Watch Video Solution

14. $\int_0^{\pi/2} \log(\tan x) dx$ =

A. $\frac{\pi}{2}$

B. 0

C. 1

D. $\frac{\pi}{4}$

Answer: B

Watch Video Solution

15. The value of $\int_{-2}^{2}\left(ax^3+bx+c\right)\,dx$ depends on the

A. value of b

B. value of c

C. value of a

D. values of a and b

Answer: B

Watch Video Solution

16. $\int_{0}^{\pi/4}\log\left(\frac{\sin x+\cos x}{\cos x}\right)dx$ is equal to

A. $\frac{\pi}{4}\log 2$

B. $\frac{\pi}{2}\log 2$

C. $\frac{\pi}{8}\log 2$

D. $\log 2$

Answer: C

Watch Video Solution

17. $\int_{-\pi/4}^{\pi/4} \frac{dx}{1+\cos 2x}$ is equal to

A. 2

B. 1

C. 4

D. 0

Answer: B

Watch Video Solution

18. $\int_{-1}^{1}\left(x^{27}\cos x+e^{x}\right)dx$ =

A. $\frac{2e-1}{e}$

B. $\frac{e+1}{e}$

C. $e-\frac{1}{e}$

D. $\frac{1}{e}$

Answer: C

Watch Video Solution

19. The value of the integral $\int_{0}^{\pi}\frac{x\sin^{2n}x}{\sin^{2n}x+\cos^{2n}x}dx$ is :

A. π^2

B. $2\pi^2$

C. $\frac{\pi^2}{4}$

D. $\frac{\pi^2}{2}$

Answer: C

Watch Video Solution

20. If $\int_0^{\pi} x f(\sin x) dx = A \int_0^{\pi/2} f(\sin x) dx$, then A is :

A. 0

B. 2π

C. $\frac{\pi}{4}$

D. π

Answer: D

Watch Video Solution

21. $\int_1^e \log x dx =$

A. 1

B. $e - 1$

C. $e + 1$

D. 0

Answer: A

Watch Video Solution