MULTIPLE CHOICE QUESTIONS

Type I : Maclaurin's Theorem and Expansion of Functions :

1. Expansion of $f(x)$ in ascending powers of x by Maclaurin's theorem is (1)

(A) $f(x) + xf'(x) + \frac{x^2}{2!}f''(x) + \ldots$ (B) $1 + x + \frac{x^2}{2!} + \ldots$

(C) $f(0) + xf'(0) + \frac{x^2}{2!}f''(0) + \ldots$ (D) $f(x) - xf'(x) + \frac{x^2}{2!}f''(x) - \frac{x^3}{3!}f''(x) + \ldots$

2. Expansion of sin x in ascending powers of x is (1)

(A) $x + \frac{x^3}{3!} + \frac{x^5}{5!} + \ldots$ (B) $x + \frac{x^2}{2!} + \frac{x^3}{3!} + \ldots$

(C) $x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \ldots$ (D) $1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \ldots$

3. Expansion of cos x in ascending powers of x is (1)

(A) $1 + \frac{x^2}{2!} + \frac{x^4}{4!} + \frac{x^6}{6!} + \ldots$ (B) $x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \ldots$

(C) $x + \frac{x^2}{2!} + \frac{x^4}{4!} + \frac{x^6}{6!} + \ldots$ (D) $1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \frac{x^6}{6!} + \ldots$

4. Expansion of tan x in ascending powers of x is (1)

(A) $1 + x + \frac{1}{3}x^3 + \frac{2}{15}x^5 + \ldots$ (B) $x - \frac{1}{3}x^3 + \frac{2}{15}x^5 - \ldots$

(C) $x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \ldots$ (D) $x + \frac{1}{3}x^3 + \frac{2}{15}x^5 + \ldots$

5. Expansion of e^x in ascending powers of x is (1)

(A) $1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \ldots$ (B) $1 - x + \frac{x^2}{2!} - \frac{x^3}{3!} + \ldots$

(C) $1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \frac{x^6}{6!} + \ldots$ (D) $x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \ldots$

6. Expansion of e^{-x} in ascending powers of x is (1)

(A) $1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \ldots$ (B) $1 - x + \frac{x^2}{2!} - \frac{x^3}{3!} + \ldots$

(C) $1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \frac{x^6}{6!} + \ldots$ (D) $x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \ldots$

7. Expansion of sinh x in ascending powers of x is (1)

(A) $1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \ldots$ (B) $x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \ldots$

(C) $1 + \frac{x^2}{2!} + \frac{x^4}{4!} + \frac{x^6}{6!} + \ldots$ (D) $x + \frac{x^3}{3!} + \frac{x^5}{5!} + \frac{x^7}{7!} + \ldots$

8. Expansion of cosh x in ascending powers of x is (1)

(A) $1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \ldots$ (B) $x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \ldots$

(C) $1 + \frac{x^2}{2!} + \frac{x^4}{4!} + \frac{x^6}{6!} + \ldots$ (D) $x + \frac{x^3}{3!} + \frac{x^5}{5!} + \frac{x^7}{7!} + \ldots$

9. Expansion of tanh x in ascending powers of x is (1)

(A) $1 + x + \frac{1}{3}x^3 + \frac{2}{15}x^5 + \ldots$ (B) $x - \frac{1}{3}x^3 + \frac{2}{15}x^5 - \ldots$

(C) $x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \ldots$ (D) $x + \frac{1}{3}x^3 + \frac{2}{15}x^5 + \ldots$

10. Expansion of log (1 + x) in ascending powers of x is (1)

(A) $x - \frac{x^2}{2} + \frac{x^3}{3} - \frac{x^4}{4} + \ldots$ (B) $-x - \frac{x^2}{2} - \frac{x^3}{3} - \frac{x^4}{4} + \ldots$

(C) $1 + \frac{x^2}{2!} + \frac{x^4}{4!} + \frac{x^6}{6!} + \ldots$ (D) $x + \frac{x^3}{3!} + \frac{x^5}{5!} + \frac{x^7}{7!} + \ldots$

11. Expansion of log (1 – x) in ascending powers of x is (1)

(A) $-x - \frac{x^2}{2} - \frac{x^3}{3} - \frac{x^4}{4} - \ldots$ (B) $x - \frac{x^2}{2} + \frac{x^3}{3} - \frac{x^4}{4} + \ldots$

(C) $1 + \frac{x^2}{2!} + \frac{x^4}{4!} + \frac{x^6}{6!} + \ldots$ (D) $x + \frac{x^3}{3!} + \frac{x^5}{5!} + \frac{x^7}{7!} + \ldots$

12. Expansion of $\frac{1}{(1-x)}$ in ascending powers of x is (1)

(A) $-1 - x - x^2 - x^3 - \ldots$ (B) $1 - x + x^2 - x^3 + \ldots$

(C) $1 + \frac{x^2}{2!} + \frac{x^4}{4!} + \frac{x^6}{6!} + \ldots$ (D) $1 + x + x^2 + x^3 + \ldots$

13. Expansion of $\frac{1}{(1+x)}$ in ascending powers of x is (1)

(A) $-1 - x - x^2 - x^3 - \ldots$ (B) $1 - x + x^2 - x^3 + \ldots$

(C) $1 + \frac{x^2}{2!} + \frac{x^4}{4!} + \frac{x^6}{6!} + \ldots$ (D) $1 + x + x^2 + x^3 + \ldots$

14. Expansion of $(1 + x)^n$ in ascending powers of x is (1)

(A) $1 - nx + \frac{n(n-1)}{2!}x^2 - \frac{n(n-1)(n-2)}{3!}x^3 + \ldots$

(B) $1 - nx + \frac{n(n+1)}{2!}x^2 - \frac{n(n+1)(n+2)}{3!}x^3 + \ldots$

(C) $1 + nx + \frac{n(n+1)}{2!}x^2 + \frac{n(n+1)(n+2)}{3!}x^3 + \ldots$

(D) $1 + nx + \frac{n(n-1)}{2!}x^2 + \frac{n(n-1)(n-2)}{3!}x^3 + \ldots$

15. The limit of the series $x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \ldots$ as x approaches to $\frac{\pi}{2}$ is (2)

(A) 0 (B) $\frac{\pi}{2}$

(C) 1 (D) -1

16. First two terms in expansion of $\log(1 + e^x)$ by Maclaurin's theorem is (2)

(A) $\log 2 + \frac{1}{2}x + \ldots$ (B) $\log 2 - \frac{1}{2}x + \ldots$

(C) $x - \frac{x^2}{2} + \ldots$ (D) $x + \frac{x^2}{2} + \ldots$

17. First two terms in expansion of sec x by Maclaurin's theorem is (2)

(A) $1 - \frac{x^2}{2!} + \ldots$ (B) $x - \frac{x^3}{3!} + \ldots$

(C) $1 + \frac{x^2}{2!} + \ldots$ (D) $x + \frac{x^3}{3!} + \ldots$

18. First two terms in expansion of $e^x \sec x$ by Maclaurin's theorem is (2)

(A) $x + x^2 + \ldots$ (B) $x - x^2 + \ldots$

(C) $1 + x + \ldots$ (D) $1 - x + \ldots$

19. First two terms in expansion of $\tan^{-1}(1 + x)$ by Maclaurin's theorem is (2)

(A) $\frac{\pi}{4} + \frac{x}{2} - \ldots$ (B) $\frac{\pi}{4} - \frac{x}{2} - \ldots$

(C) $x - \frac{x^3}{3!} + \ldots$ (D) $x + \frac{x^3}{3!} + \ldots$

20. Expansion of $\sin\left(\frac{x}{2}\right) + \cos\left(\frac{x}{2}\right)$ in ascending powers of x is (2)

(A) $1 - \frac{x}{2} + \frac{x^2}{8} + \frac{x^3}{48} - \frac{x^4}{384} + \ldots$ (B) $1 + \frac{x}{2} - \frac{x^2}{8} - \frac{x^3}{48} + \frac{x^4}{384} + \ldots$

(C) $1 + \frac{x}{2} - \frac{x^2}{8} - \frac{x^3}{24} + \frac{x^4}{120} + \ldots$ (D) $\frac{x^2}{8} - \frac{x^3}{48} + \frac{x^4}{384} + \ldots$

21. Expansion of $\log(1 - x^4) - \log(1 - x)$ in ascending powers of x is (2)

(A) $-x - \frac{x^2}{2} - \frac{x^3}{3} - \frac{3}{4}x^4 + \ldots$ (B) $x + \frac{x^2}{2} + \frac{x^3}{3} - \frac{3}{4}x^4 + \ldots$

(C) $x + \frac{x^2}{2!} + \frac{x^3}{3!} - \frac{3}{4!}x^4 + \ldots$ (D) $-x - \frac{x^2}{2!} - \frac{x^3}{3!} - \frac{3}{4!}x^4 + \ldots$

22. Expansion of $\log(1+x)^{1/x}$ in ascending powers of x is

(A) $1 - \frac{x}{2} + \frac{x^2}{3} - \frac{x^3}{4} + \ldots$ (B) $-1 - \frac{x}{2} - \frac{x^2}{3} - \frac{x^3}{4} - \ldots$

(C) $1 - \frac{x}{2!} + \frac{x^2}{3!} - \frac{x^3}{4!} + \ldots$ (D) $-1 - \frac{x}{2!} - \frac{x^2}{3!} - \frac{x^3}{4!} - \ldots$

23. Expansion of $\log(1+x)^x$ in ascending powers of x is (2)

(A) $x^2+\frac{x^3}{2}+\frac{x^4}{3}+\frac{x^5}{4}+\dots$ (B) $x^2-\frac{x^3}{2!}+\frac{x^4}{3!}-\frac{x^5}{4!}+\dots$

(C) $1+x+\frac{x^2}{2}-\frac{x^3}{3}+\frac{x^4}{4}-\frac{x^5}{5}+\dots$ (D) $x^2-\frac{x^3}{2}+\frac{x^4}{3}-\frac{x^5}{4}+\dots$

24. Expansion of $\cos^2 x$ in ascending powers of x is (2)

(A) $\frac{1}{2}\left\{1+\left(1-\frac{2^2x^2}{2!}+\frac{2^4x^4}{4!}-\dots\right)\right\}$ (B) $\frac{1}{2}\left\{1-\left(1-\frac{2^2x^2}{2!}+\frac{2^4x^4}{4!}-\dots\right)\right\}$

(C) $\frac{1}{2}\left\{1+\left(2x-\frac{2^3x^3}{3!}+\frac{2^5x^5}{5!}-\dots\right)\right\}$ (D) $\frac{1}{2}\left\{1-\left(2x-\frac{2^3x^3}{3!}+\frac{2^5x^5}{5!}-\dots\right)\right\}$

25. Expansion of $\sin x \cos x$ in ascending powers of x is (2)

(A) $\frac{1}{2}\left(1-\frac{2^2x^2}{2!}+\frac{2^4x^4}{4!}-\dots\right)$ (B) $\frac{1}{2}\left(1-\frac{x^2}{2!}+\frac{x^4}{4!}-\dots\right)$

(C) $\frac{1}{2}\left(2x-\frac{2^3x^3}{3!}+\frac{2^5x^5}{5!}-\dots\right)$ (D) $\frac{1}{2}\left(x-\frac{x^3}{3!}+\frac{x^5}{5!}-\dots\right)$

26. Expansion of $\sin 2x \cos 3x$ in ascending powers of x is (2)

(A) $\frac{1}{2}\left[\left(5x-\frac{5^3x^3}{3!}+\frac{5^5x^5}{5!}-\dots\right)-\left(x-\frac{x^3}{3!}+\frac{x^5}{5!}-\dots\right)\right]$

(B) $\frac{1}{2}\left[\left(5x-\frac{5^3x^3}{3!}+\frac{5^5x^5}{5!}-\dots\right)+\left(x-\frac{x^3}{3!}+\frac{x^5}{5!}-\dots\right)\right]$

(C) $\frac{1}{2}\left[\left(1-\frac{5^2x^2}{2!}+\frac{5^4x^4}{4!}-\dots\right)-\left(1-\frac{x^2}{2!}+\frac{x^4}{4!}-\dots\right)\right]$

(D) $\frac{1}{2}\left[\left(1-\frac{5^2x^2}{2!}+\frac{5^4x^4}{4!}-\dots\right)+\left(1-\frac{x^2}{2!}+\frac{x^4}{4!}-\dots\right)\right]$

27. Expansion of $\tan^{-1} x$ in ascending powers of x is (2)

(A) $x+\frac{x^3}{3!}+\frac{x^5}{5!}+\dots$ (B) $x-\frac{x^3}{3!}+\frac{x^5}{5!}-\dots$

(C) $x-\frac{x^3}{3}+\frac{x^5}{5}-\dots$ (D) $x+\frac{x^3}{3}+\frac{x^5}{5}+\dots$

28. Simplified expression of $1+\left(x^2-\frac{x^3}{2}+\frac{x^4}{3}-\dots\right)+\frac{1}{2}\left(x^2-\frac{x^3}{2}+\frac{x^4}{3}-\dots\right)^2+\dots$ on neglecting x^5 and higher powers of x is (2)

(A) $1+x^2+\frac{x^3}{2}+\frac{5x^4}{6}+\dots$ (B) $1+x^2-\frac{x^3}{2}-\frac{x^4}{6}-\dots$

(C) $x^2-\frac{x^3}{2}+\frac{5x^4}{6}-\dots$ (D) $1+x^2-\frac{x^3}{2}+\frac{5x^4}{6}-\dots$

29. By using substitution $x=\tan\theta$, simplified form of $\sin^{-1}\left(\frac{2x}{1+x^2}\right)$ is (2)

(A) $\tan^{-1} x$ (B) $2\cot^{-1} x$

(C) $2\tan^{-1} x$ (D) none of these

30. By using substitution $x = \tan\theta$, simplified form of $\cos^{-1}\left(\frac{x - x^{-1}}{x + x^{-1}}\right)$ is (2)

(A) $\frac{\pi}{2} + 2\tan^{-1} x$ (B) $\pi - 2\tan^{-1} x$

(C) $2\tan^{-1} x$ (D) none of these

31. If $x = \log(1 + y)$, then expansion of y in ascending powers of x is (2)

(A) $x + \frac{x^2}{2!} + \frac{x^3}{3!} + \ldots$ (B) $x - \frac{x^2}{2!} + \frac{x^3}{3!} - \ldots$

(C) $x + \frac{x^2}{2} + \frac{x^3}{3} + \ldots$ (D) $-x - \frac{x^2}{2!} - \frac{x^3}{3!} - \ldots$

Type II : Taylor's Theorem and Expansion of Functions :

32. The Taylor's series expansion of $f(x + h)$ in ascending powers of h is (1)

(A) $f(x) + hf'(x) + \frac{h^2}{2!} f''(x) + \ldots$ (B) $-f(x) - hf'(x) - \frac{h^2}{2!} f''(x) - \ldots$

(C) $f(0) + hf'(0) + \frac{h^2}{2!} f''(0) + \ldots$ (D) $f(x) - hf'(x) + \frac{h^2}{2!} f''(x) - \frac{h^3}{3!} f'''(x) + \ldots$

33. The Taylor's series expansion of $f(x + h)$ in ascending powers of x is (1)

(A) $f(h) - xf'(h) + \frac{x^2}{2!} f''(h) - \frac{x^3}{3!} f'''(h) + \ldots$

(B) $f(x) + hf'(x) + \frac{h^2}{2!} f''(x) + \ldots$

(C) $f(0) + xf'(0) + \frac{x^2}{2!} f''(0) + \ldots$

(D) $f(h) + xf'(h) + \frac{x^2}{2!} f''(h) + \ldots$

34. The Taylor's series expansion of $f(a + h)$ in ascending powers of h is (1)

(A) $f(a) + hf'(a) + \frac{h^2}{2!} f''(a) + \ldots$ (B) $f(h) + af'(h) + \frac{a^2}{2!} f''(h) + \ldots$

(C) $f(0) + hf'(0) + \frac{h^2}{2!} f''(0) + \ldots$ (D) $f(a) - hf'(a) + \frac{h^2}{2!} f''(a) - \frac{h^3}{3!} f'''(a) + \ldots$

35. Expansion of $f(x)$ in ascending powers of $(x - a)$ by Taylor's theorem is (1)

(A) $f(x) + af'(x) + \frac{a^2}{2!} f''(x) + \ldots$

(B) $f(a) + (x - a) f'(a) + \frac{(x - a)^2}{2!} f''(a) + \ldots$

(C) $f(0) - (x - a) f'(0) + \frac{(x - a)^2}{2!} f''(0) - \frac{(x - a)^3}{3!} f'''(0) + \ldots$

(D) $f(a) - (x - a) f'(a) + \frac{(x - a)^2}{2!} f''(a) - \frac{(x - a)^3}{3!} f'''(a) + \ldots$

36. First two terms in expansion of log sec x by Taylor's theorem in ascending powers of $\left(x-\frac{\pi}{4}\right)$ is (2)

(A) $\frac{1}{2}\log 2-\left(x-\frac{\pi}{4}\right)+\ldots$ (B) $\frac{1}{2}\log 2+\left(x-\frac{\pi}{4}\right)\frac{1}{2}+\ldots$

(C) $\frac{1}{2}\log 2+\left(x-\frac{\pi}{4}\right)+\ldots$ (D) $\frac{1}{2}\log 2-\left(x-\frac{\pi}{4}\right)\frac{1}{2}\ldots$

37. First two terms in expansion of $\sqrt{x+h}$ by Taylor's theorem in ascending powers of h is (2)

(A) $\sqrt{x}+h\frac{1}{\sqrt{x}}+\ldots$ (B) $\sqrt{x}-\frac{h}{2}\frac{1}{\sqrt{x}}+\ldots$

(C) $\frac{1}{\sqrt{x}}+\frac{h}{2}\frac{1}{\sqrt{x}}+\ldots$ (D) $\sqrt{x}+\frac{h}{2}\frac{1}{\sqrt{x}}+\ldots$

38. First two terms in expansion of log cos $\left(x+\frac{\pi}{4}\right)$ by Taylor's theorem in ascending powers of x is (2)

(A) $\log\frac{1}{\sqrt{2}}-x+\ldots$ (B) $\log\frac{1}{\sqrt{2}}+x+\ldots$

(C) $\log\frac{\sqrt{3}}{2}-x+\ldots$ (D) $\log\frac{\sqrt{3}}{2}+x+\ldots$

39. First two terms in expansion of $(x+2)^5+3(x+2)^4$ by Taylor's theorem in ascending powers of x is (2)

(A) $48+98x+\ldots$ (B) $80+176x+\ldots$

(C) $80+98x+\ldots$ (D) $48+176x+\ldots$

40. First two terms in expansion of $(x-1)^5+2(x-1)^4$ by Taylor's theorem in ascending powers of x is (2)

(A) $3-13x+\ldots$ (B) $1+13x+\ldots$

(C) $1-3x+\ldots$ (D) $3-3x+\ldots$

41. First two terms in expansion of sinh (x + a) by Taylor's theorem in ascending powers of x is (2)

(A) sinh a + x cosh a + … (B) sinh a – x cosh a + …

(C) cosh a + x sinh a + … (D) none of these

42. First two terms in expansion f (x + 2) + 3 $(x+2)^3+(x+2)^4$ by Taylor's theorem in ascending powers of x is (2)

(A) $42+68x+\ldots$ (B) $42+66x+\ldots$

(C) $42+69x+\ldots$ (D) $40+69x+\ldots$

43. First two terms in expansion of e^x by Taylor's theorem in ascending powers of $(x-2)$ is (2)

(A) $e^{-2}-e^2(x-2)+\ldots$ (B) $e^{-2}+e^{-2}(x-2)+\ldots$

(C) $e^2-e^2(x-2)+\ldots$ (D) $e^2+e^2(x-2)+\ldots$

44. First two terms in expansion of $\tan^{-1} x$ by Taylor's theorem in ascending powers of $(x-1)$ is (2)

(A) $\frac{\pi}{4}-\frac{1}{2}(x-1)+\ldots$ (B) $\frac{\pi}{4}+\frac{1}{2}(x-1)+\ldots$

(C) $1+\frac{1}{2}(x-1)+\ldots$ (D) $1-\frac{1}{2}(x-1)+\ldots$

45. First two terms in expansion of $\sin x$ by Taylor's theorem in ascending powers of $\left(x-\frac{\pi}{2}\right)$ is (2)

(A) $\left(x-\frac{\pi}{2}\right)-\frac{1}{3!}\left(x-\frac{\pi}{2}\right)^3+\ldots$ (B) $1+\frac{1}{2!}\left(x-\frac{\pi}{2}\right)^2+\ldots$

(C) $\left(x-\frac{\pi}{2}\right)+\frac{1}{3!}\left(x-\frac{\pi}{2}\right)^3+\ldots$ (D) $1-\frac{1}{2!}\left(x-\frac{\pi}{2}\right)^2+\ldots$

46. First two terms in expansion of $\log \cos x$ by Taylor's theorem in ascending powers of $\left(x-\frac{\pi}{4}\right)$ is (2)

(A) $\log\frac{1}{2}-\left(x-\frac{\pi}{4}\right)+\ldots$ (B) $\log\frac{1}{\sqrt{2}}+\left(x-\frac{\pi}{4}\right)+\ldots$

(C) $\log\frac{1}{\sqrt{2}}-\left(x-\frac{\pi}{4}\right)+\ldots$ (D) $\log\frac{1}{2}+\left(x-\frac{\pi}{4}\right)+\ldots$

47. First two terms in expansion of $\sin^{-1} x$ by Taylor's theorem in ascending powers of $\left(x-\frac{1}{2}\right)$ is (2)

(A) $\frac{\pi}{6}+\left(x-\frac{1}{2}\right)\frac{2}{\sqrt{3}}+\ldots$ (B) $\frac{\pi}{6}-\left(x-\frac{1}{2}\right)\frac{2}{\sqrt{3}}+\ldots$

(C) $\frac{\pi}{6}+\left(x-\frac{1}{2}\right)\frac{1}{\sqrt{2}}+\ldots$ (D) $\frac{\pi}{6}-\left(x-\frac{1}{2}\right)\frac{1}{\sqrt{2}}+\ldots$

48. First two terms in expansion of $x^{1/3}$ by Taylor's theorem in ascending powers of $(x-8)$ is (2)

(A) $2-(x-8)\frac{1}{12}+\ldots$ (B) $2+(x-8)\frac{1}{12}+\ldots$

(C) $2+(x-8)\frac{1}{24}+\ldots$ (D) $2-(x-8)\frac{1}{24}+\ldots$

49. First two terms in expansion of $\sqrt{x+2}$ by Taylor's theorem in ascending powers of $(x-2)$ is (2)

(A) $2+(x-2)\frac{1}{4}+\ldots$ (B) $2-(x-2)\frac{1}{4}+\ldots$

(C) $2+(x-2)\frac{1}{8}+\ldots$ (D) $2-(x-2)\frac{1}{8}+\ldots$

50. In the Taylor's series expansion of $e^x + \sin x$ about the point $x = \pi$, the coefficient of $(x - \pi)^2$ is (2)

(A) e^{π} (B) $e^{\pi} + 1$

(C) $e^{\pi} - 1$ (D) $\frac{1}{2}e^{\pi}$

51. Which of the following function will have only odd powers of x in its Taylor's series expansion about the point $x = 0$? (2)

(A) $\sin(x^2)$ (B) $\sin(x^3)$

(C) $\cos(x^2)$ (D) $\cos(x^3)$

Answers

1. (C)	11. (A)	22. (A)	33. (D)	44. (B)
2. (C)	12. (D)	23. (D)	34. (A)	45. (D)
3. (D)	13. (B)	24. (A)	35. (B)	46. (C)
4. (D)	14. (D)	25. (C)	36. (C)	47. (A)
5. (A)	15. (C)	26. (A)	37. (D)	48. (B)
6. (B)	16. (A)	27. (C)	38. (A)	49. (A)
7. (D)	17. (C)	28. (D)	39. (B)	50. (D)
8. (C)	18. (C)	29. (C)	40. (C)	51. (B)
9. (B)	19. (A)	30. (B)	41. (A)	
10. (A)	20. (B)	31. (A)	42. (C)	
	21. (B)	32. (A)	43. (D)	

MULTIPLE CHOICE QUESTIONS

Type I : Indeterminate Forms $\left(\frac{0}{0}, \frac{\infty}{\infty}, 0 \times \infty, \infty - \infty\right)$

1. If $f(x)$ and $g(x)$ be functions such that $f(a) = 0$ and $g(a) = 0$ then $\lim_{x \to a} \frac{f(x)}{g(x)}$ is equal to (1)

(A) $\lim_{x \to a} \frac{f'(x)}{g'(x)}$ (B) $\lim_{x \to a} \frac{g'(x)}{f'(x)}$

(C) $\frac{f(a)}{g(a)}$ (D) none of these

2. If $f(x)$ and $g(x)$ be functions such that $f(a) = 0$, $g(a) = 0$ and $f'(a) = 0$, $g'(a) = 0$ then $\lim_{x \to a} \frac{f(x)}{g(x)}$ is equal to (1)

(A) $\frac{f'(a)}{g'(a)}$ (B) $\lim_{x \to a} \frac{g'(x)}{f'(x)}$

(C) $\lim_{x \to a} \frac{f''(x)}{g''(x)}$ (D) none of these

3. If $f(x)$ and $g(x)$ be functions such that $f(a) = \infty$ and $g(a) = \infty$ then $\lim_{x \to a} \frac{f(x)}{g(x)}$ is equal to (1)

(A) $\lim_{x \to a} \frac{f'(x)}{g'(x)}$ (B) $\lim_{x \to a} \frac{g'(x)}{f'(x)}$

(C) $\frac{f(a)}{g(a)}$ (D) none of these

4. $\lim_{x \to \pi/2} \frac{1 - \sin x}{\cos x}$ is equal to (1)

(A) 1 (B) 0

(C) $\frac{1}{2}$ (D) –1

5. $\lim_{x \to 0} \frac{\sin x}{x}$ is equal to (1)

(A) 2 (B) 0

(C) –1 (D) 1

6. $\lim_{x \to 0} \frac{\tan x}{x}$ is equal to (1)

(A) 2 (B) 1

(C) $\frac{\pi}{2}$ (D) $\frac{3}{2}$

7. $\lim_{x \to 0} \frac{\sin^{-1} x}{x}$ is equal to (1)

(A) 1 (B) –1

(C) $\frac{1}{2}$ (D) $\frac{\pi}{2}$

8. $\lim_{x \to 0} (1 + x)^{1/x}$ is equal to (1)

(A) 1 (B) e^2

(C) $\frac{1}{e}$ (D) e

9. $\lim_{x \to \infty} \left(1 + \frac{1}{x}\right)^x$ is equal to (1)

(A) 1 (B) e

(C) $\frac{1}{e}$ (D) e^2

10. $\lim_{x \to 0} \frac{e^x - 1}{x}$ is equal to (1)

(A) 2 (B) $\frac{1}{2}$

(C) 1 (D) none of these

11. $\lim_{x \to 0} \frac{a^x - 1}{x}$ is equal to (1)

(A) a (B) = log a

(C) log a (D) 1

12. $\lim_{\theta \to 0} \frac{\sin\left(\frac{\theta}{2}\right)}{\theta}$ is equal to (2)

(A) 1 (B) 2

(C) $\frac{1}{2}$ (D) not defined

13. $\lim_{x \to 0} \frac{\sin^2 x}{x}$ is equal to (2)

(A) –1
(B) 1
(C) 0
(D) not defined

14. $\lim_{x \to 0} \frac{1 - \cos x}{x}$ is equal to (2)

(A) 0
(B) 1
(C) –1
(D) 2

15. $\lim_{x \to 3} \frac{2x^2 - 7x + 3}{5x^2 - 12x - 9}$ is equal to (2)

(A) $-\frac{1}{3}$
(B) $\frac{2}{5}$
(C) $\frac{5}{18}$
(D) 0

16. $\lim_{x \to 0} \frac{a^x - b^x}{x}$ is equal to (2)

(A) 0
(B) 1
(C) $\log \frac{b}{a}$
(D) $\log \frac{a}{b}$

17. $\lim_{x \to 0} \frac{\sin^2 x}{x \cos x}$ is equal to (2)

(A) 0
(B) 1
(C) –1
(D) 2

18. $\lim_{x \to 0} \frac{e^{ax} - e^{-ax}}{\log (1 + bx)}$ is equal to (2)

(A) $\frac{a}{2b}$
(B) 0
(C) $\frac{b}{2a}$
(D) $\frac{2a}{b}$

19. $\lim_{x \to 0} \frac{(1 + x)^n - 1}{x}$ is equal to (2)

(A) n
(B) 1
(C) e
(D) 0

20. $\lim_{x \to 0} \frac{2^x - 1}{\sqrt{(1+x)} - 1}$ is equal to (2)

(A) $\log 2$ (B) $\frac{1}{2}\log 2$

(C) 0 (D) $2 \log 2$

21. $\lim_{x \to 0} \frac{\sqrt{(1+x)} - \sqrt{(1-x)}}{x}$ is equal to (2)

(A) 0 (B) –1

(C) 1 (D) 2

22. If $\lim_{x \to 0} \frac{\sin 2x + p \sin x}{x^3}$ is finite then value of p is equal to (2)

(A) –2 (B) 2

(C) 1 (D) –1

23. If $\lim_{x \to 0} \frac{a \sinh x - 5 \sin x}{x^3}$ is finite then value of a is equal to (2)

(A) –5 (B) 5

(C) 0 (D) 10

24. If $\lim_{x \to 0} \frac{a \sin 2x + \tan x}{x^3}$ is finite then value of a is equal to (2)

(A) –2 (B) 2

(C) $-\frac{1}{2}$ (D) $\frac{1}{2}$

25. If $\lim_{x \to 0} \frac{2 \cos x - 2 + bx^2}{x^4}$ is finite then value of b is equal to (2)

(A) 2 (B) 0

(C) 1 (D) –1

26. $\lim_{x \to \pi/4} \frac{1 - \tan x}{1 - \sqrt{2} \sin x}$ is equal to (2)

(A) 2 (B) 0

(C) 1 (D) –2

27. $\lim_{x \to \infty} \frac{\log x}{x^n}$ is equal to (2)

(A) 2 (B) –2

(C) 1 (D) 0

28. $\lim_{x \to \infty} \frac{\log(1 + e^{3x})}{x}$ is equal to (2)

(A) 9 (B) 3

(C) $\frac{1}{3}$ (D) 0

29. $\lim_{x \to 0} x \log x$ is equal to (2)

(A) 2 (B) –1

(C) 1 (D) 0

30. $\lim_{x \to \infty} x \sin \frac{1}{x}$ is equal to (2)

(A) 2 (B) 0

(C) 1 (D) –1

31. $\lim_{x \to 1} (1 - x) \tan \frac{\pi x}{2}$ is equal to (2)

(A) $\frac{2}{\pi}$ (B) $\frac{\pi}{2}$

(C) π (D) 0

32. $\lim_{x \to \pi/2} (1 - \sin x) \tan x$ is equal to (2)

(A) 1 (B) –1

(C) π (D) 0

33. $\lim_{x \to \pi/2} (\sec x - \tan x)$ is equal to (2)

(A) 1 (B) –1

(C) π (D) 0

34. $\lim_{x \to \pi/2} \left(x \tan x - \frac{\pi}{2} \sec x\right)$ is equal to (2)

(A) 1 (B) –1

(C) π (D) 0

35. $\lim_{x \to \infty} \left[x - x^2 \log \left(1 + \frac{1}{x} \right) \right]$ is equal to (2)

(A) 1 (B) $-\frac{1}{2}$

(C) $\frac{1}{2}$ (D) 0

36. $\lim_{x \to 0} \left[\frac{1}{x} - \frac{1}{x^2} \log (1 + x) \right]$ is equal to (2)

(A) 1 (B) $-\frac{1}{2}$

(C) $\frac{1}{2}$ (D) 0

37. $\lim_{x \to 0} \left[\frac{1}{x} - \frac{1}{\sin x} \right]$ is equal to (2)

(A) 1 (B) $-\frac{1}{2}$

(C) $\frac{1}{2}$ (D) 0

38. $\lim_{x \to 0} \left[\frac{1}{x} - \frac{1}{e^x - 1} \right]$ is equal to (2)

(A) 1 (B) $-\frac{1}{2}$

(C) $\frac{1}{2}$ (D) 0

39. $\lim_{x \to \pi/2} \left[\tan x - \frac{2x \sec x}{\pi} \right]$ is equal to (2)

(A) $\frac{2}{\pi}$ (B) $-\frac{2}{\pi}$

(C) $\frac{\pi}{2}$ (D) 0

40. $\lim_{x \to 1} \left[\frac{x}{\log x} - \frac{1}{\log x} \right]$ is equal to (2)

(A) –1 (B) 1

(C) $\frac{1}{2}$ (D) 0

Type II : Indeterminate Forms ($0^0, \infty^0, 1^\infty$) :

41. $\lim_{x \to \infty} \left(\frac{1}{x}\right)^{1/x}$ is equal to (2)

(A) e (B) $-\frac{1}{2}$

(C) $\frac{1}{2}$ (D) 1

42. $\lim_{x \to 0} (\sin x)^{\tan x}$ is equal to (2)

(A) 1 (B) e

(C) –1 (D) $\frac{1}{e}$

43. $\lim_{x \to \pi/2} (\cos x)^{\cos x}$ is equal to (2)

(A) –1 (B) e

(C) 1 (D) $\frac{1}{e}$

44. $\lim_{x \to 0} (x)^x$ is equal to (2)

(A) e (B) 1

(C) –1 (D) none of these

45. $\lim_{x \to \infty} (x)^{1/x}$ is equal to (2)

(A) e (B) –1

(C) 1 (D) none of these

46. $\lim_{x \to \pi/2} (\sec x)^{\cot x}$ is equal to (2)

(A) e (B) 1

(C) $\frac{1}{e}$ (D) does not exist

47. $\lim_{x \to \infty} \left(1 + \frac{a}{x}\right)^x$ is equal to (2)

(A) e^{-a} (B) e^a

(C) 1 (D) none of these

48. $\lim_{x \to 1} (x)^{\frac{1}{x-1}}$ is equal to (2)

(A) e
(B) 1
(C) −1
(D) none of these

49. $\lim_{x \to 0} (\cos x)^{1/x}$ is equal to (2)

(A) e
(B) 1
(C) −1
(D) none of these

50. $\lim_{x \to 0} (\cos x)^{\cot x}$ is equal to (2)

(A) 1
(B) e
(C) −1
(D) none of these

51. $\lim_{x \to 1} (1 - x^2)^{\frac{1}{\log (1-x)}}$ is equal to (2)

(A) e
(B) $\frac{1}{e}$
(C) 1
(D) e^2

52. $\lim_{x \to 0} \left(\frac{a+x}{a-x}\right)^{1/x}$ is equal to (2)

(A) $e^{2/a}$
(B) $e^{1/2a}$
(C) 1
(D) $e^{a/2}$

53. $\lim_{x \to 0} (1 + \sin x)^{\cot x}$ is equal to (2)

(A) $e^{1/2}$
(B) e^2
(C) 1
(D) e

54. $\lim_{x \to \pi/2} (\text{cosec } x)^{\tan x}$ is equal to (2)

(A) e^{-1}
(B) e^2
(C) 1
(D) e

Answers

1. (A)	12. (C)	23. (C)	34. (B)	45. (C)
2. (C)	13. (C)	24. (C)	35. (C)	46. (B)
3. (A)	14. (A)	25. (C)	36. (C)	47. (B)
4. (B)	15. (C)	26. (A)	37. (D)	48. (A)
5. (D)	16. (D)	27. (D)	38. (C)	49. (B)
6. (B)	17. (A)	28. (B)	39. (A)	50. (A)
7. (A)	18. (D)	29. (D)	40. (B)	51. (A)
8. (D)	19. (A)	30. (C)	41. (D)	52. (A)
9. (B)	20. (D)	31. (A)	42. (A)	53. (D)
10. (C)	21. (C)	32. (D)	43. (C)	54. (C)
11. (C)	22. (A)	33. (D)	44. (B)	

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