1. If $f(x)=\begin{cases} x\sin\frac{1}{x}, & x\neq 0 \\ 0, & x=0 \end{cases}$, then $\lim_{x\to 0} f(x)=$

(a) 1 (b) 0

(c) –1 (d) None of these

2. $\lim_{n\to\infty}\frac{\sqrt{n}}{\sqrt{n}+\sqrt{n+1}}=$

(a) 1 (b) 1/2

(c) 0 (d) ∞

3. $\lim_{x\to a}\frac{\sqrt{3x-a}-\sqrt{x+a}}{x-a}=$

(a) $\sqrt{2a}$ (b) $1/\sqrt{2a}$

(c) $2a$ (d) $1/2a$

4. If $\lim_{x\to 2}\frac{x^n-2^n}{x-2}=80$, where n is a positive integer, then $n=$

(a) 3 (b) 5

(c) 2 (d) None of these

5. $\lim_{x\to 1}\frac{(2x-3)(\sqrt{x}-1)}{2x^2+x-3}=$

(a) –1/10 (b) 1/10

(c) –1/8 (d) None of these

6. $\lim_{x\to 0}\frac{\log\cos x}{x}=$

(a) 0 (b) 1

(c) ∞ (d) None of these

7. If $f(9)=9$, $f'(9)=4$, then $\lim_{x\to 9}\frac{\sqrt{f(x)}-3}{\sqrt{x}-3}=$

(a) 2 (b) 4

(c) –2 (d) –4

8. $\lim_{h\to 0}\frac{\sqrt{x+h}-\sqrt{x}}{h}=$

(a) $\frac{1}{2\sqrt{x}}$ (b) $\frac{1}{\sqrt{x}}$

(c) $2\sqrt{x}$ (d) $\sqrt{x}$

9. $\lim_{x\to 0}\frac{1-\cos mx}{1-\cos nx}=$

(a) m/n (b) n/m

(c) $\frac{m^2}{n^2}$ (d) $\frac{n^2}{m^2}$

10. $\lim_{x\to 0}\frac{2\sin^2 3x}{x^2}=$

(a) 6 (b) 9

(c) 18 (d) 3

11. $\lim_{\alpha\to\pi/4}\frac{\sin\alpha-\cos\alpha}{\alpha-\frac{\pi}{4}}=$

(a) $\sqrt{2}$ (b) $1/\sqrt{2}$

(c) 1 (d) None of these

12. $\lim_{x\to a}\frac{x^2-a^2}{x-a}=$

(a) $4a$ (b) 1

(c) $2a$ (d) 0

13. $\lim_{x\to a}\frac{(x+2)^{5/3}-(a+2)^{5/3}}{x-a}=$

(a) $\frac{5}{3}(a+2)^{2/3}$ (b) $\frac{5}{3}(a+2)^{5/3}$

(c) $\frac{5}{3}a^{2/3}$ (d) $\frac{5}{3}a^{5/3}$

14. $\lim_{x\to 0}\frac{\cos ax-\cos bx}{x^2}=$

(a) $\frac{a^2-b^2}{2}$ (b) $\frac{b^2-a^2}{2}$

(c) a^2-b^2 (d) b^2-a^2

15. $\lim_{x\to 0}\frac{(1+x)^5-1}{(1+x)^3-1}=$

(a) 0 (b) 1

(c) 5/3 (d) 3/5

16. If $\lim_{x\to a}\frac{x^9+a^9}{x+a}=9$, then $a=$

(a) $9^{1/8}$ (b) ± 2

(c) ± 3 (d) None of these

17. $\lim_{x\to 0+}\frac{xe^{1/x}}{1+e^{1/x}}=$

(a) 0 (b) 1

(c) ∞ (d) None of these

18. $\lim_{x\to 1}[x]=$

(a) 0 (b) 1

(c) Does not exist (d) None of these

19. $\lim_{x\to 0}\frac{\sin 2x+\sin 6x}{\sin 5x-\sin 3x}=$

(a) 1/2 (b) 1/4

(c) 2 (d) 4

20. $\lim_{x\to\infty}[x(a^{1/x}-1)]\,,(a>1)=$

(a) $\log x$ (b) 1

(c) 0 (d) $-\log\frac{1}{a}$

21. $\lim_{n\to\infty}\left[\frac{\Sigma n^2}{n^3}\right]=$

(a) $-\frac{1}{6}$ (b) $\frac{1}{6}$

(c) $\frac{1}{3}$ (d) $-\frac{1}{3}$

22. $\lim_{x\to\alpha}\frac{\sin x-\sin\alpha}{x-\alpha}=$

(a) 0 (b) 1

(c) $\sin\alpha$ (d) $\cos\alpha$

23. $\lim_{x\to 3}\left\{\frac{x-3}{\sqrt{x-2}-\sqrt{4-x}}\right\}=$

(a) 1 (b) 2

(c) –1 (d) –2

24. $\lim_{x\to 0}\frac{x\cos x-\sin x}{x^2\sin x}=$

(a) $\frac{1}{3}$ (b) $-\frac{1}{3}$

(c) 1 (d) None of these

25. $\lim_{x\to 0}\frac{y^2}{x}=$ ..... , where $y^2=ax+bx^2+cx^3$

(a) 0 (b) 1

(c) a (d) None of these

26. $\lim_{x\to 0}\frac{(1+x)^{1/2}-(1-x)^{1/2}}{x}=$

(a) 0 (b) 1/2

(c) 1 (d) –1

27. $\lim_{x\to 1}\frac{1-x^{-1/3}}{1-x^{-2/3}}=$

(a) $\frac{1}{3}$ (b) $\frac{1}{2}$

(c) $\frac{2}{3}$ (d) $-\frac{2}{3}$

28. $\lim_{x\to 0}\frac{(1+x)^n-1}{x}=$

(a) n (b) 1

(c) –1 (d) None of these

29. $\lim_{\theta\to 0}\frac{1-\cos\theta}{\theta^2}=$

(a) 1 (b) 2

(c) $\frac{1}{2}$ (d) $\frac{1}{4}$

30. $\lim_{\theta\to 0}\frac{5\theta\cos\theta-2\sin\theta}{3\theta+\tan\theta}=$

(a) $\frac{3}{4}$ (b) $-\frac{3}{4}$

(c) 0 (d) None of these

31. $\lim_{x\to 0}\frac{\sin(2+x)-\sin(2-x)}{x}=$

(a) $\sin 2$ (b) $2\sin 2$

(c) $2\cos 2$ (d) 2

32. $\lim_{x\to\infty}\frac{(2x+1)^{40}(4x-1)^5}{(2x+3)^{45}}=$

(a) 16 (b) 24

(c) 32 (d) 8

33. $\lim_{x\to 0}\left[\frac{x}{\tan^{-1}2x}\right]=$

(a) 0 (b) $\frac{1}{2}$

(c) 1 (d) ∞

34. $\lim_{x\to\pi/2}\frac{1+\cos 2x}{(\pi-2x)^2}=$

(a) 1 (b) 2

(c) 3 (d) $\frac{1}{2}$

35. $\lim_{x\to 0}\frac{\sin mx}{\tan nx}=$

(a) $\frac{n}{m}$ (b) $\frac{m}{n}$

(c) mn (d) None of these

36. $\lim_{x\to 0}\frac{3\sin x-\sin 3x}{x^3}=$

(a) 4 (b) –4

(c) $\frac{1}{4}$ (d) None of these

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

(a) $\frac{\pi}{2}$ (b) 1

(c) 0 (d) ∞

38. $\lim_{x\to a} f(x).\, g(x)$ exists, if

(a) $\lim_{x\to a} f(x)$ and $\lim_{x\to a} g(x)$ exist

(b) $\lim_{x\to a} f(x)^{g(x)}$ exists

(c) $\lim_{x\to a}\frac{f(x)}{g(x)}$ exists

(d) $\lim_{x\to a} f(x)g\left(\frac{1}{x}\right)$ exists

39. $\lim_{n\to\infty}(4^n+5^n)^{1/n}$ is equal to

(a) 4 (b) 5

(c) e (d) None of these

40. The value of $\lim_{x\to\infty}\sqrt{a^2x^2+ax+1}-\sqrt{a^2x^2+1}$ is

(a) $\frac{1}{2}$ (b) 1

(c) 2 (d) None of these

v

41. $\lim_{x\to 0}\frac{e^{\tan x}-e^x}{\tan x-x}=$

(a) 1 (b) e

(c) e^{-1} (d) 0

42. $\lim_{x\to -1}\frac{\sqrt{\pi}-\sqrt{\cos^{-1}x}}{\sqrt{x+1}}$ is given by

(a) $\frac{1}{\sqrt{\pi}}$ (b) $\frac{1}{\sqrt{2\pi}}$

(c) 1 (d) 0

43. If $f(x)=\frac{2}{x-3}$, $g(x)=\frac{x-3}{x+4}$ and $h(x)=-\frac{2(2x+1)}{x^2+x-12}$, then $\lim_{x\to 3}[f(x)+g(x)+h(x)]$ is

(a) –2 (b) –1

(c) $-\frac{2}{7}$ (d) 0

44. The value of $\lim_{x\to 0}\left(\frac{a^x+b^x+c^x}{3}\right)^{2/x}$; $(a, b, c>0)$ is

(a) $(abc)^3$ (b) abc

(c) $(abc)^{1/3}$ (d) None of these

45. $\lim_{x\to\infty}\frac{(2x-3)(3x-4)}{(4x-5)(5x-6)}=$

(a) 0 (b) 1/10

(c) 1/5 (d) 3/10

46. If $f(x)=\frac{\sin(e^{x-2}-1)}{\log(x-1)}$, then $\lim_{x\to 2} f(x)$ is given by

(a) –2 (b) –1

(c) 0 (d) 1

47. If $f(x)=\begin{cases}x, & \text{if } x \text{ is rational}\\ -x, & \text{if } x \text{ is irrational}\end{cases}$, then $\lim_{x\to 0} f(x)$ is

(a) Equal to 0 (b) Equal to 1

(c) Equal to –1 (d) Indeterminate

48. $\lim_{x\to\infty}\left[1+\frac{1}{mx}\right]^x$ equal to

(a) $e^{1/m}$ (b) $e^{-1/m}$

(c) e^m (d) m^e

49. The value of the limit of $\frac{x^3-x^2-18}{x-3}$ as x tends to 3 is

(a) 3 (b) 9

(c) 18 (d) 21

50. $\lim_{x\to\infty}\frac{2x^2+3x+4}{3x^2+3x+4}$ is equal to

(a) $\frac{2}{3}$ (b) 1

(c) 0 (d) ∞

51. If $f(x)=|x-2|$, then

(a) $\lim_{x\to 2+} f(x)\neq 0$

(b) $\lim_{x\to 2-} f(x)\neq 0$

(c) $\lim_{x\to 2+} f(x)\neq\lim_{x\to 2-} f(x)$

(d) $f(x)$ is continuous at $x=2$

52. The function $f(x)=\frac{\log(1+ax)-\log(1-bx)}{x}$ is not defined at $x=0$. The value which should be assigned to f at $x=0$ so that it is continuos at $x=0$, is

(a) $a-b$ (b) $a+b$

(c) $\log a+\log b$ (d) $\log a-\log b$

53. If $f(x)=\begin{cases}e^{1/x}, \text{ when } x\neq 0\\ 0, \quad \text{when } x=0\end{cases}$, then

(a) $\lim\limits_{x\to 0+} f(x)=e$

(b) $\lim\limits_{x\to 0+} f(x)=0$

(c) $f(x)$ is discontinuous at $x=0$

(d) None of these

54. If $f(x)=\begin{cases}\frac{x^2-4x+3}{x^2-1}, \text{ for } x\neq 1\\ 2, \text{ for } x=1\end{cases}$, then

(a) $\lim\limits_{x\to 1+} f(x)=2$

(b) $\lim\limits_{x\to 1-} f(x)=3$

(c) $f(x)$ is discontinuous at $x=1$

(d) None of these

55. If $f(x)=\begin{cases}\frac{\sin x}{x}+\cos x, \text{ when } x\neq 0\\ 2, \text{when } x=0\end{cases}$ then

(a) $\lim\limits_{x\to 0+} f(x)\neq 2$ (b) $\lim\limits_{x\to 0-} f(x)=0$

(c) $f(x)$ is continuous at $x=0$ (d) None of these

56. If $f(x)=\begin{cases}x^2\sin\frac{1}{x}, \quad \text{when } x\neq 0\\ 0, \quad \text{when } x=0\end{cases}$, then

(a) $f(0+0)=1$ (b) $f(0-0)=1$

(c) f is continuous at $x=0$ (d) None of these

57. If $f(x)=\begin{cases}(1+2x)^{1/x}, \text{for } x\neq 0\\ e^2, \text{for } x=0\end{cases}$, then

(a) $\lim\limits_{x\to 0+} f(x)=e$

(b) $\lim\limits_{x\to 0-} f(x)=e^2$

(c) $f(x)$ is discontinuous at $x=0$

(d) None of these

58. If $f(x)=\begin{cases}2^{1/x}, \text{for } x\neq 0\\ 3, \text{for } x=0\end{cases}$, then

(a) $\lim\limits_{x\to 0+} f(x)=0$ (b) $\lim\limits_{x\to 0-} f(x)=\infty$

(c) $f(x)$ is continuous at $x=0$ (d) None of these

59. If $f(x)=\begin{cases}x-1, & x<0\\ \frac{1}{4}, & x=0\\ x^2, & x>0\end{cases}$, then

(a) $\lim\limits_{x\to 0+} f(x)=1$

(b) $\lim\limits_{x\to 0-} f(x)=1$

(c) $f(x)$ is discontinuous at $x=0$

(d) None of these

60. Which of the following statements is true for graph $f(x)=\log x$

(a) Graph shows that function is continuous

(b) Graph shows that function is discontinuous

(c) Graph finds for negative and positive values of x

(d) Graph is symmetric along x-axis

61. If function $f(x)=\begin{cases}\frac{x^2-1}{x-1}, \text{ when } x\neq 1\\ k, \text{when } x=1\end{cases}$ is continuous at $x=1$, then the value of k will be

(a) –1 (b) 2

(c) –3 (d) –2

62. At which points the function $f(x)=\frac{x}{[x]}$, where $[.]$ is greatest integer function, is discontinuous

(a) Only positive integers

(b) All positive and negative integers and (0, 1)

(c) All rational numbers

(d) None of these

63. For the function $f(x)=\begin{cases}\frac{\sin^2 ax}{x^2}, \text{when } x\neq 0\\ 1, \text{when } x=0\end{cases}$ which one is a true statement

(a) $f(x)$ is continuous at $x=0$

(b) $f(x)$ is discontinuous at $x=0$, when $a\neq\pm 1$

(c) $f(x)$ is continuous at $x=a$

(d) None of these

64. If $f(x)=\begin{cases}-x^2, \text{when } x\leq 0\\ 5x-4, \text{when } 0<x\leq 1\\ 4x^2-3x, \text{when } 1<x<2\\ 3x+4, \text{when } x\geq 2\end{cases}$, then

(a) $f(x)$ is continuous at $x=0$

(b) $f(x)$ is continuous $x=2$

(c) $f(x)$ is discontinuous at $x=1$

(d) None of these

65. If $f(x)=\begin{cases}1+x^2, & \text{when } 0\le x\le 1\\ 1-x, & \text{when } x>1\end{cases}$, then

(a) $\lim\limits_{x\to 1^+} f(x)\neq 0$

(b) $\lim\limits_{x\to 1^-} f(x)\neq 2$

(c) $f(x)$ is discontinuous at $x=1$

(d) None of these

66. If $f(x)=\begin{cases}\dfrac{x^2-1}{x+1}, & \text{when } x\neq -1\\ -2, & \text{when } x=-1\end{cases}$, then

(a) $\lim\limits_{x\to(-1)^-} f(x)=-2$

(b) $\lim\limits_{x\to(-1)^+} f(x)=-2$

(c) $f(x)$ is continuous at $x=-1$

(d) All the above are correct

67. If $f(x)=|x-b|$, then function

(a) Is continuous at $x=1$ (b) Is continuous at $x=b$

(c) Is discontinuous at $x=b$ (d) None of these

68. If $f(x)=\begin{cases}\dfrac{|x-a|}{x-a}, & \text{when } x\neq a\\ 1, & \text{when } x=a\end{cases}$, then

(a) $f(x)$ is continuous at $x=a$

(b) $f(x)$ is discontinuous at $x=a$

(c) $\lim\limits_{x\to a} f(x)=1$

(d) None of these

69. If $f(x)=\begin{cases}1+x, & \text{when } x\le 2\\ 5-x, & \text{when } x\le 3\end{cases}$, then

(a) $f(x)$ is continuous at $x=2$

(b) $f(x)$ is discontinuous at $x=2$

(c) $f(x)$ is continuous at $x=3$

(d) None of these

70. If $f(x)=\begin{cases}x\sin x, & \text{when } 0<x\le\dfrac{\pi}{2}\\ \dfrac{\pi}{2}\sin(\pi+x), & \text{when } \dfrac{\pi}{2}<x<\pi\end{cases}$, then

(a) $f(x)$ is discontinuous at $x=\pi/2$

(b) $f(x)$ is continuous at $x=\pi/2$

(c) $f(x)$ is continuous at $x=0$

(d) None of these

71. If $f(x)=\begin{cases}\dfrac{1-\cos 4x}{x^2}, & \text{when } x<0\\ a, & \text{when } x=0\\ \dfrac{\sqrt{x}}{\sqrt{(16+\sqrt{x})}-4}, & \text{when } x>0\end{cases}$,

is continuous at $x=0$, then the value of 'a' will be

(a) 8 (b) –8

(c) 4 (d) None of these

72. If $f(x)=\begin{cases}\dfrac{x-|x|}{x}, & \text{when } x\neq 0\\ 2, & \text{when } x=0\end{cases}$, then

(a) $f(x)$ is continuous at $x=0$

(b) $f(x)$ is discontinuous at $x=0$

(c) $\lim\limits_{x\to 0} f(x)=2$

(d) None of these

73. If $f(x)=\begin{cases}x^2, & \text{when } x\le 1\\ x+5, & \text{when } x>1\end{cases}$, then

(a) $f(x)$ is continuous at $x=1$

(b) $f(x)$ is discontinuous at $x=1$

(c) $\lim\limits_{x\to 1} f(x)=1$

(d) None of these

74. Let $f(x)=\begin{cases}\dfrac{x-4}{|x-4|}+a, & x<4\\ a+b, & x=4\\ \dfrac{x-4}{|x-4|}+b, & x>4\end{cases}$. Then $f(x)$ is continuous at $x=4$ when

(a) $a=0, b=0$ (b) $a=1, b=1$

(c) $a=-1, b=1$ (d) $a=1, b=-1$

75. If the function $f(x)=\begin{cases}1+\sin\dfrac{\pi x}{2}, & \text{for } -\infty<x\le 1\\ ax+b, & \text{for } 1<x<3\\ 6\tan\dfrac{x\pi}{12}, & \text{for } 3\le x<6\end{cases}$ is continuous in the interval $(-\infty,6)$, then the values of a and b are respectively

(a) 0, 2 (b) 1, 1

(c) 2, 0 (d) 2, 1

76. If the function $f(x)=\begin{cases}\dfrac{k\cos x}{\pi-2x}, & \text{when } x\neq\dfrac{\pi}{2}\\ 3, & \text{when } x=\dfrac{\pi}{2}\end{cases}$ be continuous at $x=\dfrac{\pi}{2}$, then $k=$

(a) 3 (b) 6

(c) 12 (d) None of these

77. Let $f(x)=\begin{cases}\dfrac{x^3+x^2-16x+20}{(x-2)^2}, & \text{if } x\neq 2\\ k, & \text{if } x=2\end{cases}$. If $f(x)$ be continuous for all x, then $k=$

(a) 7 (b) -7

(c) ± 7 (d) None of these

78. If $f(x)=\begin{cases}(x^2/a)-a, & \text{when } x<a\\ 0, & \text{when } x=a\\ a-(x^2/a), & \text{when } x>a\end{cases}$, then

(a) $\lim\limits_{x\to a} f(x)=a$

(b) $f(x)$ is continuous at $x=a$

(c) $f(x)$ is discontinuous at $x=a$

(d) None of these

79. If $f(x)=\begin{cases}\dfrac{x^4-16}{x-2}, & \text{when } x\neq 2\\ 16, & \text{when } x=2\end{cases}$, then

(a) $f(x)$ is continuous at $x=2$

(b) $f(x)$ is discountinous at $x=2$

(c) $\lim\limits_{x\to 2} f(x)=16$

(d) None of these

80. Let $f(x)=\begin{cases}\dfrac{x^4-5x^2+4}{|(x-1)(x-2)|}, & x\neq 1,2\\ 6, & x=1\\ 12, & x=2\end{cases}$

Then $f(x)$ is continuous on the set

(a) R (b) $R-\{1\}$

(c) $R-\{2\}$ (d) $R-\{1,2\}$

81. If $f(x)=\begin{cases}x\dfrac{e^{(1/x)}-e^{(-1/x)}}{e^{(1/x)}+e^{(-1/x)}}, & x\neq 0\\ 0, & x=0\end{cases}$ then which of the following is true

(a) f is continuous and differentiable at every point

(b) f is continuous at every point but is not differentiable

(c) f is differentiable at every point

(d) f is differentiable only at the origin

82. If $f(x)=|x-3|$, then f is

(a) Discontinuous at $x=2$

(b) Not differentiable $x=2$

(c) Differentiable at $x=3$

(d) Continuous but not differentiable at $x=3$

83. Let $h(x)=\min\{x,x^2\}$, for every real number of x. Then

(a) h is continuous for all x

(b) h is differentiable for all x

(c) $h'(x)=1$, for all $x>1$

(d) h is not differentiable at two values of x

84. There exists a function $f(x)$ satisfying $f(0)=1$, $f'(0)=-1$, $f(x)>0$ for all x and

(a) $f(x)<0, \forall x$ (b) $-1<f''(x)<0, \forall x$

(c) $-2<f''(x)\le -1, \forall x$ (d) $f''(x)<-2, \forall x$

85. The function $f(x)=\begin{cases}x, & \text{if } 0\le x\le 1\\ 1, & \text{if } 1<x\le 2\end{cases}$ is

(a) Continuous at all x, $0\le x\le 2$ and differentiable at all x, except $x=1$ in the interval [0,2]

(b) Continuous and differentiable at all x in [0,2]

(c) Not continuous at any point in [0,2]

(d) Not differentiable at any point [0,2]

86. The function $f(x)=|x|$ at $x=0$ is

(a) Continuous but non-differentiable

(b) Discontinuous and differentiable

(c) Discontinuous and non-differentiable

(d) Continuous and differentiable

87. A function $f(x)=\begin{cases}1+x, & x\le 2\\ 5-x, & x>2\end{cases}$ is

(a) Not continuous at $x=2$

(b) Differentiable at $x=2$

(c) Continuous but not differentiable at $x=2$

(d) None of these

88. The left-hand derivative of $f(x)=[x]\sin(\pi x)$ at $x=k$, k is an integer and $[x]$ = greatest integer $\le x$, is

(a) $(-1)^k(k-1)\pi$ (b) $(-1)^{k-1}(k-1)\pi$

(c) $(-1)^k k\pi$ (d) $(-1)^{k-1}k\pi$

89. Let $f(x)=\begin{cases}x+1, & \text{when } x<2\\ 2x-1, & \text{when } x\ge 2\end{cases}$, then $f'(2)=$

(a) 0 (b) 1

(c) 2 (d) Does not exist

90. The function $f(x)=\begin{cases}e^{2x}-1, & x\le 0\\ ax+\dfrac{bx^2}{2}-1, & x>0\end{cases}$ is continuous and differentiable for

(a) $a=1,b=2$ (b) $a=2,b=4$

(c) $a=2$, any b (d) Any a, $b=4$

91. The function $f(x)=x^2\sin\frac{1}{x}, x\neq 0,\ f(0)=0$ at $x=0$

(a) Is continuous but not differentiable
(b) Is discontinuous
(c) Is having continuous derivative
(d) Is continuous and differentiable

92. The value of m for which the function $f(x)=\begin{cases} mx^2, x\le 1 \\ 2x, x>1 \end{cases}$ is differentiable at $x=1$,is

(a) 0 (b) 1
(c) 2 (d) Does not exist

93. Let $f(x)=\begin{cases} \sin x, & \text{for } x\ge 0 \\ 1-\cos x, & \text{for } x\le 0 \end{cases}$ and $g(x)=e^x$. Then $(gof)'(0)$ is

(a) 1 (b) –1
(c) 0 (d) None of these

94. Suppose $f(x)$ is differentiable at $x=1$ and $\lim_{h\to 0}\frac{1}{h}f(1+h)=5$, then $f'(1)$ equals

(a) 5 (b) 6
(c) 3 (d) 4

95. If f is a real- valued differentiable function satisfying $|f(x)-f(y)|\le (x-y)^2, x, y\in R$ and $f(0)=0$, then $f(1)$ equal

(a) 2 (b) 1
(c) –1 (d) 0

96. Let f be continuous on [1, 5] and differentiable in (1, 5). If $f(1)=-3$ and $f'(x)\ge 9$ for all $x\in(1,5)$, then

(a) $f(5)\ge 33$ (b) $f(5)\ge 36$
(c) $f(5)\le 36$ (d) $f(5)\ge 9$
(e) $f(5)\le 9$

97. Let $f(x+y)=f(x)f(y)$ and $f(x)=1+\sin(3x)g(x)$ where $g(x)$ is continuous then $f'(x)$ is

(a) $f(x)g(0)$ (b) $3g(0)$
(c) $f(x)\cos 3x$ (d) $3f(x)g(0)$
(e) $3f(x)g(x)$

98. If $f(x)=\begin{cases} x+2, -1<x<3 \\ 5, \quad x=3 \\ 8-x, \quad x>3 \end{cases}$, then at $x=3$, $f'(x)=$

(a) 1 (b) – 1
(c) 0 (d) Does not exist

99. If $f(x)=\begin{cases} ax^2+b;\ x\le 0 \\ x^2;\ x>0 \end{cases}$ possesses derivative at $x=0$, then

(a) $a=0, b=0$
(b) $a>0, =0$
(c) $a\in R, =0$
(d) None of these

100. If $f(x)=x(\sqrt{x}-\sqrt{x+1})$, then

(a) $f(x)$ is continuous but non- differentiable at $x=0$
(b) $f(x)$ is differentiable at $x=0$
(c) $f(x)$ is not differentiable at $x=0$
(d) None of these