OBJECTIVE QUESTIONS DIFFERENTIATION

1. If $y = 2^x$ then $\frac{dy}{dx}$ =?

   (a) $x(2^{x-1})$ (b) $\frac{2^x}{(\log 2)}$ (c) $2^x(\log 2)$ (d) none of these

2. If $y=\log_{10} x$ then $\frac{dy}{dx}$ =?

   (a) $\frac{1}{x}$ (b) $\frac{1}{x}(\log 10)$ (c) $\frac{1}{x(\log 10)}$ (d) none of these

3. If $y=e^{1/x}$ then $\frac{dy}{dx}$ =?

   (a) $\frac{1}{x}.e^{(1/x-1)}$ (b) $\frac{-e^{1/x}}{x^2}$ (c) $e^{1/x}\log x$ (d) none of these

4. If $y = x^x$ then $\frac{dy}{dx}$ = ?

   (a) $x^x \log x$ (b) $x^x(1 + \log x)$ (c) $x(1 + \log x)$ (d) none of these

5. If $y = x^{\sin x}$ then $\frac{dy}{dx}$ = ?

   (a) $(\sin x).\ X^{(\sin x - 1)}$ (b) $(\sin x \cos x).\ x^{(\sin x - 1)}$

   (c) $x^{\sin x}\left\{\frac{\sin x + x\log x.\cos x}{x}\right\}$ (d) none of these

6. If $y= x^{\sqrt{x}}$ then $\frac{dy}{dx}$ = ?

   (a) $\sqrt{x}.\ x^{(\sqrt{x}-1)}$ (b) $\frac{x^{\sqrt{x}}\log x}{2\sqrt{x}}$ (c) $x^{\sqrt{x}}\left\{\frac{2+\log x}{2\sqrt{x}}\right\}$ (d) none of these

7. If $y=e^{\sin\sqrt{x}}$ then $\frac{dy}{dx}$ =?

   (a) $e^{\sin\sqrt{x}}.\cos\sqrt{x}$ (b) $\frac{e^{\sin\sqrt{x}}\cos\sqrt{x}}{2\sqrt{x}}$ (c) $\frac{e^{\sin}\sqrt{x}}{2\sqrt{x}}$ (d) none of these

8. If $y = (\tan x)^{\cot x}$ then $\frac{dy}{dx}$ = ?

   (a) $\cot x.\ (\tan x)^{\cot x - 1}\ .\ \sec^2 x$ (b) $-(\tan x)^{\cot x}\ .\ \text{cosec}^2 x$

   (c) $(\tan x)^{\cot x}\ .\ \text{cosec}^2 x(1 - \log \tan x)$ (d) none of these

9. If $y = (\sin x)^{\log x}$ then $\frac{dy}{dx}$ =?

(a) (log x). $(\sin x)^{(\log x - 1)}$. cos x

(b) $(\sin x)^{\log x} \cdot \left\{\frac{x \log x + \log \sin x}{x}\right\}$

(c) $(\sin x)^{\log x} \cdot \left\{\frac{(x \log x)\cot x + \log \sin x}{x}\right\}$

(d) none of these

10. If $y = \sin(x^x)$ then $\frac{dy}{dx}$ = ?

(a) $x^x \cos(x^x)$ (b) $x^x \cos x^x (1 + \log x)$

(c) $(\sin x)^{\log x} \cdot \left\{\frac{(x \log x)\cot x + \log \sin x}{x}\right\}$

(d) none of these

11. If $y = \sqrt{x \sin x}$ then $\frac{dy}{dx}$ =?

(a) $\frac{(x\cos x + \sin x)}{2\sqrt{x \sin x}}$ (b) $\frac{1}{2}$(x cos x + sin x). $\sqrt{x \sin x}$

(c) $\frac{1}{2\sqrt{x \sin x}}$ (d) none of these

12. If $e^{x+y} = xy$ then $\frac{dy}{dx}$ =?

(a) $\frac{x(1-y)}{y(x-1)}$ (b) $\frac{y(1-x)}{x(y-1)}$ (c) $\frac{(x-xy)}{(xy-y)}$ (d) none of these

13. If (x + y) = sin(x + y) then $\frac{dy}{dx}$ = ?

(a) -1 (b) 1 (c) $\frac{1-\cos(x+y)}{\cos^2(x+y)}$ (d) none of these

14. If $\sqrt{x} + \sqrt{y} = \sqrt{a}$ then $\frac{dy}{dx}$ = ?

(a) $\frac{-\sqrt{x}}{\sqrt{y}}$ (b) $-\frac{1}{2}.\frac{\sqrt{y}}{\sqrt{x}}$ (c) $\frac{-\sqrt{y}}{\sqrt{x}}$ (d) none of these

15. If $x^y = y^x$ then $\frac{dy}{dx}$ =?

(a) $\frac{(y - x\log y)}{(x - y\log x)}$ (b) $\frac{y(y - x\log y)}{x(x - y\log x)}$ (c) $\frac{y(y + x\log y)}{x(x + y\log x)}$ (d) none of these

16. If $x^p y^q = (x + y)^{(p+q)}$ then $\frac{dy}{dx}$ = ?

(a) $\frac{x}{y}$ (b) $\frac{y}{x}$ (c) $\frac{x^{p-1}}{y^{q-1}}$ (d) none of these

17. If $y = x^2 \sin\frac{1}{x}$ then $\frac{dy}{dx}$ = ?

(a) $x \sin\frac{1}{x} - \cos\frac{1}{x}$ (b) $-\cos\frac{1}{x} + 2x \sin\frac{1}{x}$

(c) $-x \sin\frac{1}{x} + \cos\frac{1}{x}$ (d) none of these

18. If $y = \cos^2 x^3$ then $\frac{dy}{dx}$ = ?

(a) $-3x^2 \sin(2x^3)$ (b) $-3x^2 \sin^2 x^3$ (c) $-3x^2 \cos^2(2x^3)$ (d) none of these

19. If $y = \log(x + \sqrt{x^2 + a^2})$ then $\frac{dy}{dx}$ = ?

(a) $\frac{1}{2(x + \sqrt{x^2 + a^2})}$ (b) $\frac{-1}{\sqrt{x^2 + a^2}}$ (c) $\frac{1}{\sqrt{x^2 + a^2}}$ (d) none of these

20. If $y = \log\left(\frac{1+\sqrt{x}}{1-\sqrt{x}}\right)$ then $\frac{dy}{dx}$ = ?

(a) $\frac{1}{\sqrt{x(1-x)}}$ (b) $\frac{-1}{x(1-\sqrt{x})^2}$ (c) $\frac{-\sqrt{x}}{2(1-\sqrt{x})}$ (d) none of these

21. If $y = \log\left(\frac{\sqrt{1+x^2}+x}{\sqrt{1+x^2}-x}\right)$ then $\frac{dy}{dx}$ = ?

(a) $\frac{2}{\sqrt{1+x^2}}$ (b) $\frac{2\sqrt{1+x^2}}{x^2}$ (c) $\frac{-2}{\sqrt{1+x^2}}$ (d) none of these

22. If y = $\sqrt{\frac{1+\sin x}{1-\sin x}}$ then $\frac{dy}{dx}$ =?

(a) $\frac{1}{2}\sec^2\left(\frac{\pi}{4}-\frac{x}{2}\right)$ (b) $\frac{1}{2}\text{cosec}^2\left(\frac{\pi}{4}-\frac{x}{2}\right)$

(c) $\frac{1}{2}\text{cosec}\left(\frac{\pi}{4}-\frac{x}{2}\right)\cot\left(\frac{\pi}{4}-\frac{x}{2}\right)$ (d) none of these

23. If y = $\sqrt{\frac{\sec x-1}{\sec x+1}}$ then $\frac{dy}{dx}$ =?

(a) $\sec^2 x$ (b) $\frac{1}{2}\sec^2\frac{x}{2}$ (c) $\frac{-1}{2}\text{cosec}^2\frac{x}{2}$ (d) none of these

24. If y = $\sqrt{\frac{1+\tan x}{1-\tan x}}$ then $\frac{dy}{dx}$ = ?

(a) $\frac{1}{2}\sec^2 x.\tan\left(x+\frac{\pi}{4}\right)$ (b) $\frac{\sec^2\left(x+\frac{\pi}{4}\right)}{2\sqrt{\tan\left(x+\frac{\pi}{4}\right)}}$

(c) $\frac{\sec^2\left(\frac{x}{4}\right)}{\sqrt{\tan\left(x+\frac{\pi}{4}\right)}}$ (d) none of these

25. If y = $\tan^{-1}\left(\frac{1-\cos x}{\sin x}\right)$ then $\frac{dy}{dx}$ = ?

(a) 1 (b) -1 (c) $\frac{1}{2}$ (d) $\frac{-1}{2}$

26. If y =$\tan^{-1}\left\{\frac{\cos x+\sin x}{\cos x-\sin x}\right\}$ then $\frac{dy}{dx}$ = ?

(a) 1 (b) -1 (c) $\frac{1}{2}$ (d) $\frac{-1}{2}$

27. If $y = \tan^{-1}\left\{\frac{\cos x}{1+\sin x}\right\}$ then $\frac{dy}{dx}$ = ?

(a) $\frac{1}{2}$ (b) $\frac{-1}{2}$ (c) 1 (d) -1

28. If $y = \tan^{-1}\sqrt{\frac{1-\cos x}{1+\cos x}}$ then $\frac{dy}{dx}$ = ?

(a) $\frac{-1}{2}$ (b) $\frac{1}{2}$ (c) $\frac{1}{(1+x^2)}$ (d) none of these

29. If $y = \tan^{-1}\left(\frac{a\cos x - b\sin x}{b\cos x + a\sin x}\right)$ then $\frac{dy}{dx}$ = ?

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

30. If $y = \sin^{-1}(3x - 4x^3)$ then $\frac{dy}{dx}$ = ?

(a) $\frac{3}{\sqrt{1-x^2}}$ (b) $\frac{-4}{\sqrt{1-x^2}}$ (c) $\frac{3}{\sqrt{1+x^2}}$ (d) none of these

31. If $y = \cos^{-1}(4x^3 - 3x)$ then $\frac{dy}{dx}$ = ?

(a) $\frac{3}{\sqrt{1-x^2}}$ (b) $\frac{-3}{\sqrt{1-x^2}}$ (c) $\frac{4}{\sqrt{1-x^2}}$ (d) $\frac{-4}{(3x^2-1)}$

32. If $y = \tan^{-1}\left(\frac{\sqrt{a}+\sqrt{x}}{1-\sqrt{ax}}\right)$ then $\frac{dy}{dx}$ = ?

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

33. If $y = \cos^{-1}\left(\frac{x^2-1}{x^2+1}\right)$ then $\frac{dy}{dx}$ =?

(a) $\frac{2}{(1+x^2)}$ (b) $\frac{-2}{(1+x^2)}$ (c) $\frac{2x}{(1+x^2)}$ (d) none of these

34. If $y = \tan^{-1}\left(\frac{1+x^2}{1-x^2}\right)$ then $\frac{dy}{dx}$ = ?

(a) $\frac{2x}{(1+x^4)}$ (b) $\frac{-2x}{(1+x^4)}$ (c) $\frac{x}{(1+x^4)}$ (d) none of these

35. If $y = \cos^{-1} x^3$ then $\frac{dy}{dx}$ = ?

(a) $\frac{-1}{(1+x)}$ (b) $\frac{2}{\sqrt{(1+x)}}$ (c) $\frac{-1}{2\sqrt{x(1+x)}}$ (d) none of these

36. If $y = \cos^{-1} x^3$ then $\frac{dy}{dx}$ =?

(a) $\frac{-1}{\sqrt{1-x^6}}$ (b) $\frac{-3x^2}{\sqrt{1-x^6}}$ (c) $\frac{-3}{x^2\sqrt{1-x^6}}$ (d) none of these

37 If $y = \tan^{-1}(\sec x + \tan x)$ then $\frac{dy}{dx}$ = ?

(a) $\frac{1}{2}$ (b) $\frac{-1}{2}$ (c) 1 (d) none of these

38. If $y = \cot^{-1}\left(\frac{1-x}{1+x}\right)$ then $\frac{dy}{dx}$ = ?

(a) $\frac{-1}{(1+x^2)}$ (b) $\frac{1}{(1+x^2)}$ (c) $\frac{1}{(1+x^2)^{3/2}}$ (d) none of these

39. If $y = \sqrt{\frac{1+x}{1-x}}$ then $\frac{dy}{dx}$ = ?

(a) $\frac{2}{(1-x)^2}$ (b) $\frac{x}{(1-x)^{3/2}}$ (c) $\frac{1}{(1-x)^{3/2}.(1+x)^{1/2}}$ (d) none of these

40. If $y = \sec^{-1}\left(\frac{x^2+1}{x^2-1}\right)$ then $\frac{dy}{dx}$ = ?

(a) $\frac{-2}{(1+x^2)}$ (b) $\frac{2}{(1+x^2)}$ (c) $\frac{-1}{(1-x^2)}$ (d) none of these

41. If $y = \sec^{-1}\left(\frac{1}{2x^2-1}\right)$ then $\frac{dy}{dx}$ = ?

(a) $\frac{-2}{(1+x^2)}$ (b) $\frac{-2}{(1-x^2)}$ (c) $\frac{-2}{\sqrt{1-x^2}}$ (d) none of these

42. If $y = \tan^{-1}\left(\frac{\sqrt{1+x^2}-1}{x}\right)$ then $\frac{dy}{dx}$ = ?

(a) $\frac{1}{(1+x^2)}$ (b) $\frac{2}{(1+x^2)}$ (c) $\frac{1}{2(1+x^2)}$ (d) none of these

43. If $y = \sin^{-1}\left\{\frac{\sqrt{1+x}+\sqrt{1-x}}{2}\right\}$ then $\frac{dy}{dx}$ = ?

(a) $\frac{-1}{2\sqrt{1-x^2}}$ (b) $\frac{1}{2\sqrt{1-x^2}}$ (c) $\frac{1}{2(1+x^2)}$ (d)none of these

44. If $x = at^2$, $y = 2at$ then $\frac{dy}{dx}$ = ?

(a) $\frac{1}{t}$ (b) $\frac{-1}{t^2}$ (c) $\frac{-2}{t}$ (d) none of these

45. If $x = a\sec\theta$, $y = b\tan\theta$ then $\frac{dy}{dx}$ = ?

(a) $\frac{b}{a}\sec\theta$ (b) $\frac{b}{a}\text{cosec}\ \theta$ (c) $\frac{b}{a}\cot\theta$ (d) none of these

46. If $x = a\cos^2\theta$, $y = b\sin^2\theta$ then θ then $\frac{dy}{dx}$ = ?

(a) $\frac{-a}{b}$ (b) $\frac{a}{b}\cot\theta$ (c) $\frac{-b}{a}$ (d) none of these

47. If $x = a(\cos\theta + \theta\sin\theta)$ and $y = a(\sin\theta - \theta\cos\theta)$ then $\frac{dy}{dx}$ = ?

(a) $\cot\theta$ (b) $\tan\theta$ (c) $a\cot\theta$ (d) $a\tan\theta$

48. If $y = x^{x^{x^{/\!/\infty}}}$ then $\frac{dy}{dx}$ = ?

(a) $\frac{y}{x(1-\log x)}$ (b) $\frac{y^2}{x(1-\log x)}$ (c) $\frac{y^2}{x(1-y\log x)}$ (d) none of these

49. If y = $\sqrt{x+\sqrt{x+\sqrt{x+}}}$...∞ then $\frac{dy}{dx}$ = ?

(a) $\frac{1}{(2y-1)}$ (b) $\frac{1}{(y^2-1)}$ (c) $\frac{2y}{(y^2-1)}$ (d) none of these

50. If y = $\sqrt{\sin x+\sqrt{\sin x+\sqrt{\sin x+}}}$ ... ∞ then $\frac{dy}{dx}$ = ?

(a) $\frac{\sin x}{(2y-1)}$ (b) $\frac{\cos x}{(y-1)}$ (c) $\frac{\cos x}{(2y-1)}$ (d) none of these

51. If y = $e^{x e^{x e^{x \ldots \infty}}}$ then $\frac{dy}{dx}$ = ?

(a) $\frac{1}{(1-y)}$ (b) $\frac{y}{(1-y)}$ (c) $\frac{y}{(y-1)}$ (d) none of these

52. The value of k for which f (x) = $\begin{cases}\frac{\sin 5x}{3x}, if & x \neq 0\\ k, & \text{if } x=0\end{cases}$ is continuous at x=0 is

(a) $\frac{1}{3}$ (b) 0 (c) $\frac{3}{5}$ (d) $\frac{5}{3}$

53. Let f(x) = $\begin{cases}x\sin\frac{1}{x},\\ 0, when x=0.\end{cases}$

Then, which of the following is the true statement?

(a) f (x) is not defined at x =0 (b) $\lim_{x\to 0} f(x)$ does not exist

(c) f(x) i s continuous at x =0 (d) f(x)is discontinuous at x =0

54. The value of k for which f(x) = $\begin{cases}\frac{3x+4\tan x}{x}, when x \neq 0\\ k \quad , \text{when } x=0\end{cases}$ is continuous at x = 0,is

(a) 7 (b) 4 (c) 3 (d) none of these

55. Let f(x) = $x^{3/2,}$ Then, f ′(0) = ?

(a) $\frac{3}{2}$ (b) $\frac{1}{2}$ (c) does not exist (d) none of these

56. The function f(x)= $|x| \ \forall \ x \in R$ is

(a) continuous but not differentiable at x =0

(b) differentiable but not continuous at x =0

(c) neither continuous nor differentiable at x = 0

(d) none of these

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

(a) continuous as well as differentiable at x = 2

(b) continuous but not differentiable at x = 2

(c) differentiable but not continuous at x = 2

(d) none of these

58. If the function f(x) = $\begin{cases} kx+5, & when \quad x \le 2 \\ x-1, & when \quad x > 2 \end{cases}$ is continuous at x =2 then k = ?

(a) 2 (b) -2 (c) 3 (d) -3

59. If the function f(x) = $\begin{cases} \frac{1-\cos 4x}{8x^2}, x \ne 0 \\ k, \quad x = 0 \end{cases}$ is continuous at x = 0 then k =?

(a) 1 (b) 2 (c) $\frac{1}{2}$ (d) $\frac{-1}{2}$

60. If the function f(x) = $\begin{cases} \frac{\sin^2 ax}{x^2}, when \quad x \ne 0 \\ k, \quad when \quad x = 0 \end{cases}$ is continuous at x=0 then k =?

(a) a (b) a^2 (c) -2 (d) -4

61. If the function (x) = $\begin{cases} \frac{k\cos x}{(\pi - 2x)}, when & x \neq \frac{\pi}{2} \\ 3, when & x = \frac{\pi}{2} \end{cases}$ be continuous at x = $\frac{\pi}{2}$, then the value of k is

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

62. At x = 2, f(x) =[x] is

(a) continuous but not differentiable

(b) differentiable but not continuous

(c) continuous as well as differentiable

(d) none of these

63. Let f(x) = $\begin{cases} \frac{x^2 - 2x - 3}{x + 1.}, when & x \neq -1 \\ k, & when \quad x = -1 \end{cases}$ If f(x) is continuous at x=-1 then k = ?

(a) 4 (b) -4 (c) -3 (d) 2

64. The function f(x) = x^3-6x^2 + 15x – 12is

(a) strictly decreasing on R (b) strictly increasing on R

(c) increasing in (-∞, 2] and decreasing in (2,∞) (d) none of these

65. The function f(x) = 4 – 3x + 3x^2 – x^3 is

(a) decreasing on R (b) increasing on R

(c) strictly decreasing on R (d) strictly increasing on R

66. The function f(x) = 3x + cos 3x is

(a) increasing on R (b) decreasing on R (c) strictly increasing R

(d) strictly decreasing on R

67. The function f(x) = x^3 -6x^2 + 9x + 3 is decreasing for

(a) 1< x < 3 (b) x > 1 (c) x < 1 (d) x< 1 or x > 3

68. The function f(x) = x^3 – 27x + 8 is increasing when

(a) $|x|$ < 3 (b) $|x|$ > 3 (c) -3 < x <3 (d) none of these

69. f(x) = sin x is increasing in)

(a) $\left(\frac{\pi}{2},\pi\right)$ (b) $\left(\pi,\frac{3\pi}{2}\right)$ (c) $(0,\pi)$ (d) $\left(\frac{-\pi}{2},\frac{\pi}{2}\right)$

70. f(x) = $\frac{2x}{\log x}$ is increasing in

(a) (0, 1) (b) (1,e) (c) (e, ∞) (d) ($-\infty$, e)

71. If (x) =(sin x – cos x) is decreasing in

(a) $\left(0,\frac{3\pi}{4}\right)$ (b) $\left(\frac{3\pi}{4},\frac{7\pi}{4}\right)$ (c) $\left(\frac{7\pi}{4},2\pi\right)$ (d) none of these

72. f(x) = $\frac{x}{\sin x}$ is

(a) increasing in (0,1) (b) decreasing in (0,1)

(c) increasing in $\left(0,\frac{1}{2}\right)$ and decreasing in $\left(\frac{1}{2},1\right)$ (d) none of these

73. f(x) = x^x is decreasing in the interval

(a) (0,e) (b) $\left(0,\frac{1}{e}\right)$ (c) (0,1) (d) none of these

74. f(x) = x^2e^{-x} is increasing in

(a) (-2,0) (b) (0,2) (c) $(2,\infty)$ (d) $(-\infty,\infty)$

75. f(x) =sin x- kx is decreasing for all x $\in$ R, when

(a) k<1 (b) k ≤ 1 (c) k >1 (d) k$\geq$1

76. f(x)= $(x + 1)^3$ $(x – 3)^3$ is increasing in

(a) ($-\infty$,1) (b) (-1, 3) (c) (3, ∞) (d) (1, ∞)

77. f(x)=$[x(x – 3)]^2$ is increasing in

(a) (0, ∞) (b) ($-\infty$, 0) (c) (1, 3) (d) $\left(0,\frac{3}{2}\right)\cup(3,\infty)$

78. If f(x) = $kx^3 – 9x^2 + 9x +3$ is increasing for every real number x, then

(a) k> 3 (b) k ≥ 3 (c) k < 3 (d) k ≤ 3

79. f(x) = $\frac{x}{(x^2+1)}$ is increasing in

(a) (-1, 1) (b) (-1, ∞) (c) $(-\infty,-1)\cup(1,\infty)$ (d) none of these

80. The least value of k for which f(x) = x^2 + 1 is increasing on (1,2), is

(a) -2 (b) -1 (c) 1 (d) 2

81. f(x) = $|x|$ has

(a) minimum at x = 0 (b) maximum at x = 0

(c) neither a maximum nor a minimum at x =0

(d) none of these

82. When x is positive, the minimum value of x^x is

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

83. The maximum value of $\left(\frac{\log x}{x}\right)$ is

(a) $\left(\frac{1}{e}\right)$ (b) $\frac{2}{e}$ (c) e (d) 1

84. f(x) = cosec x in $(-\pi,0)$ has a maxima at

(a) x = 0 (b) $x=\frac{-\pi}{4}$ (c) $x=\frac{-\pi}{3}$ (d) $x=\frac{-\pi}{2}$

85. If x >0 and xy = 1, the minimum value of (x + y) is

(a) -2 (b) 1 (c) 2 (d) none of these

86. The minimum value of $\left(x^2+\frac{250}{x}\right)$ is

(a) 0 (b) 25 (c) 50 (d) 75

87. The minimum value of f(x) = $3x^4$ -$8x^3$ -48x + 25 on [0,3] is

(a) 16 (b) 25 (c) -39 (d) none of these

88. The maximum value of f(x) = (x – 2)$(x – 3)^2$ is

(a) $\frac{7}{3}$ (b) 3 (c) $\frac{4}{27}$ (d) 0

89. The least value of $f(x) = (e^x + e^{-x})$ is

(a) -2 (b) 0 (c) 2 (d) none of these

ANSWERS :DIFFERENTIATION

1.(c)	2.(c)	3.(b)	4.(b)	5.(c)	6.(c)	7.(b)	8.(c)	9.(c)	10.(b)
11.(a)	12.(b)	13.(a)	14.(c)	15.(b)	16.(b)	17.(b)	18.(a)	19.(c)	20.(a)
21.(a)	22.(b)	23.(b)	24.(b)	25.(c)	26.(a)	27.(b)	28.(b)	29.(d)	30.(a)
31.(b)	32.(d)	33.(b)	34.(a)	35.(c)	36.(b)	37.(a)	38.(b)	39.(c)	40.(a)
41.(c)	42.(c)	43.(a)	44.(a)	45.(b)	46.(c)	47.(b)	48.(c)	49.(a)	50.(c)
51.(b)	52.(d)	53.(c)	54.(a)	55.(c)	56.(a)	57.(b)	58.(b)	59.(c)	60.(b)
61.(d)	62.(d)	63.(b)	64.(b)	65.(a)	66.(a)	67.(a)	68.(b)	69.(d)	70.(c)
71.(b)	72.(a)	73.(b)	74.(b)	75.(c)	76.(d)	77.(d)	78.(a)	79.(a)	80.(a)
81.(a)	82.(c)	83.(a)	84.(d)	85.(c)	86.(d)	87.(c)	88.(c)	89.(c)	

MULTIPLE CHOICE QUESTIONS(ROLLE,S/MVT THEOREM)

1. The value of c in LMV theorem for f(x) = $x^2+x-1.x\in[0,4]$ is

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

2. The value of c in Rolle's theorem for f (x) = $\cos x, x\in\left[-\frac{\pi}{2},\frac{\pi}{2}\right] is$

   (a) $-\frac{\pi}{4}$. (b) $\frac{\pi}{4}$. (c) 0. (d) 1.

3. The value of c in Rolle's theorem for f(x) =x^2+2x-8, x$\in$[-4, 2].

   (a) -1. (b) 2. (c) 1. (d) -2

4. The value of c in LMV theorem for $f(x)=x^2, x\in[0,1]$ is

   (a) $\frac{1}{4}$. (b) 0. (c) $\frac{1}{2}$. (d) 1.

5. The value of c in LMV theorem for the function $f(x)=x+\frac{1}{x}, x\in[1,4]$ is

   (a) $\frac{7}{2}$. (b) -2. (c) 3. (d) 2.

6. The value of c in Rolle's theorem for the function $f(x)=x^3-3x$

   In the interval $[0,\sqrt{3}]$ is

   (a) 1 (b) -1 (c) $\frac{3}{2}$. (d) $\frac{1}{3}$.

7. For the function $f(x)=x+\frac{1}{x}, x\in[1,3]$, the value of c for mean Value theorem

   (a) 1. (b) $\sqrt{3}$. (c) 2. (d) none of these

Answers

1. (b) 2. (c) 3. (a) 4. (c) 5. (d) 6. (a) 7. (b)

MAXIMA/MINIMA: Questions

1. Suppose $f(x)$ is differentiable at $x=\alpha.$ Then, necessary condition for $f(x)$ to possess local maxima or local minima at $x=\alpha.$ is

   (a) $f(\alpha)=0.$ (b) $f'(\alpha)=0.$ (c) $f''(\alpha)=0.$ (d) $f'''(\alpha)=0.$

2. The point of inflexion for the function $f(x)=x^3$ is

   (a) $x=0.$ (b) $x=-1.$ (c) $x=1.$ (d) $x=2.$

3. The absolute maximum value of x^3 is

   (a) 0. (b) 8. (c) 27. (d) Does not exist.

4. The absolute minimum value of x^3 is

   (a) -8 . (b) 0. (c) Does not exist. (d) 8.

5. The absolute minimum value of $|4-x|$ is

   (a) 6. (b) 0. (c) 4. (d) -2.

6. If x is real, the minimum value of $x^2-8x+17$ is

   (a) -1. (b) 0. (c) 1. (d) 2.

7. The smallest value of the polynomial $x^3-18x^2+96x.$ in [0,9] is

   (a) 126. (b) 0. (c) 135. (d 160.

8. Maximum slope of the curve $y=-x^3+3x^2+9x-27$ is

   (a) 0. (b) 12. (c) 16. (d) 32.

ANSWERS

1 (b) 2. (a) 3. (d) 4. (c)

(5) (b) 6. (c) 7. (b) 8` (b)

1. The total revenue in Rs received from the sale of x units of an article is given by the equation R $(x) = 3x^2 + 36x + 5$. The marginal revenue when $x = 15$ is

   (a) 126. (b) 116. (c) 96. (d) 90.

2. The approximate change in the volume of a cube of side x m caused by increasing the side by 3% is

   (a) $0.9x^3m^3$. (b) $0.09x^3m^3$. (c) $0.6x$ m^3. (d) $0.06x^3m^3$.

3. If $y = x^3$, then value of Δy for $x = 2$ and $\Delta x = 0.02$ is

   (a) 0.12 (b) 0.32 (c) 0.24 (d) 0.16

4. The function $f(x) = x^3 + 3x$ is increasing on

   (a) $(-\infty, 0)$. (b) $(0, \infty)$. (c) $\Re$. (d) $(0,1)$.

5. The function $f(x) = \log_b x, x$ >0 is increasing when

   (a) 0 < b < 1. (b) b > 1. (c) b < 1. (d) b = 1.

6. The interval on which the function $f(x) = 2x^3 + 9x^2 + 12x - 1$ is decreasing is

   (a) $[-1, \infty)$. (b) $[-2, -1]$. (c) $(-\infty, -2]$. (d) $[-1, 1]$.

ANSWERS

1. (a) 2. (b) 3. (c) 4. (c) 5. (b) 6. (b)