CHAPTER 6

APPLICATION OF DERIVATIVES

TRUE FALSE QUESTIONS

Sl.No.	Question(Read the statements and state TRUE or FALSE.
1	The function (x) is said to be strictly increasing if $f'(x) > 0$.
2	The function (x) is said to be strictly decreasing if $f'(x) \leq 0$.
3	The logarithmic function f(x) = log x is strictly decreasing on (0, ∞).
4	The function given by f (x) = $e^{5x}$is neither increasing nor decreasing on R.
5	The function f(x) = cos x is strictly decreasing on $\left(\frac{\pi}{2}, \pi\right)$.
6	The slope of the tangent parallel to the the line x + y = 0 is 1.
7	The tangent to the curve y = x^3 +6 and at the point (-1, 5) and (1, 7) are parallel.
8	If the normal is parallel to the y-axis then $\frac{dy}{dx}$ is 0.
9	The tangent to the curve x = t^2 – 1 and y = t^2 – t is parallel to the x-axis at t = 0.
10	At the point (1, 2) the tangent to the curve y = $2x^2$ – x + 1 is parallel to the line y = 3x + 9.
11	A point x = c is said to be a critical point of f if $f'(c)\ is\ =\ 0$
12	Minimum value of f if f(x) = sin x in $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$ is 1
13	Let f have second derivative at x = c such that $f'(c) = 0$ and $f''(c) > 0$ then f has a local maximum
14	Extreme points of the function $f(x) = x + \frac{1}{x}$ are 1 and – 1
15	A function$f(x) = 4x^3 - 18x^2 + 27x - 7$ has a point of inflection $\frac{3}{2}$.
16	If a function has first derivative at x = a such that $f'(a) = 0$ and sign of f' is changing its sign from negative to positive then f has a local minimum.
17	f(x) = sin x + $\sqrt{3}cos\ x$ has maximum value at x = $\frac{\pi}{6}$
18	Every continuous function on a closed interval has maximum and a minimum value.
19	Local minimum value of a function may be greater than the local maximum value.
20	The minimum value of $x^2 - 8x + 17$ is 1
21	The equation of the normal to the curve $y = x(2 - x)$ at the point (2,0) is $x - 2y = 2$
22	The function $f(x) = (x + 2)e^{-x}$ is strictly increasing in the interval (-1,∞).

23	The tangent to the curve $y = x^2 + 3x + 4$ at (-2,2) passes through origin.
24	The curve $y^2 = x^3 - 1$ possess two tangents parallel to the x-axis.
25	The curves $x = y^2$ and $xy = k$ cut at right angles if $k^2 = 8$.
26	The function $f(x) = x^3 - 8$ is strictly increasing in the interval (1,2).
27	The function $f(x) = x^3 - 3x^2 + 4x$ is strictly increasing in R
28	The tangent at any point on the curve $y = 2x^7 + 3x + 5$ makes an obtuse angle with x-axis.
29	The normal to the curve $\sqrt{x} + \sqrt{y} = \sqrt{a}$ at (a,0) is parallel to x-axis.
30	The normal to the curve $x = a(1 + cos\theta), y = asin\theta$ at any point θ always passes through the point(a,0)
31	A monotonic function has its maximum or minimum value at endpoints of a given interval. True/False
32	A function f(x) is said to have a maximum value in I, if there exists a point c in I such that $f(c) < f(x) forall\ x \in I$. True/ False
33	Both minimum and maximum value of f(x) = x where x∈ (0, 1) exist. True/False
34	Let c is local minima if there is an h> 0 such that $f(c) \geq f(x)\ for\ all\ x\ in\ (c-h, c+h), x \neq c$ True/ False
35	In function $f(x) = x^3$, x=0 is the point of inflection. True/False
36	The local minimum value of the function $f = 3 + \|x - 3\|$ is 3 True/False
37	Critical points of function in the given interval are where $f' = 0$ or f is not differentiable. True/False
38	sin(x) has infinite points of local maxima and local minima.
39	The maximum value of Signum Function is 1
40	The minimum value of Greatest Integer function f=[x] in $[\sqrt{2}, \sqrt{5}]$ is 0 True/False
41	The tangent to the curve y= e^{2x} at point (0,1) meets X Axis at (- ½ , 0) .
42	The equation to the normal to the curve y =sin x at (0,0) is x – y = 0.
43	Slope of the tangent of the locus y= $\cos^{-1}$(cos x) at x= $\frac{-\pi}{4}$ is 1.
44	The Equation of the normal to the curve x= a $\cos^3$ t , y =a $\sin^3$ t at point t=$\frac{\pi}{4}$ is x= -y .
45	The point at which tangents to the curve y= x^3 -12x +18 are parallel to the X axis are (4,0) (-2,0) .

46	The interval on which the function f(x) = 2 x^3 + 9 x^2 +12 x -1 is decreasing is [-2,-1] .
47	The point at which normal to the curve y= 2x^2 -2x +7 has slope 1/6 is (-1,11) .
48	Function cos x is decreasing in (0 , $\frac{\pi}{2}$).
49	The function f(x) =tan x – x is always increases .
50	The Function f(x) = sin x is decreasing on (0, $\frac{\pi}{2}$) .
51	Least value of the function $f(x)=ax+\frac{b}{x},\ a>0,b>0,x>0$ is $2\sqrt{ab}$.
52	At $x=0$ the function $f(x)=\left(4-x^2\right)^{2/3}$ has a local minimum value.
53	The function $f(x)=x^{1/x}$ has no maximum value.
54	Maximum value of the function $f(x)=3\sin x+4\cos x,\ x\in R$ is 5.
55	Maximum value of the function $f(x)=\sin^4 x+\cos^4 x,\ x\in R$ is 2.
56	Of all rectangles of a given perimeter, square has the largest area.
57	Of all rectangles of a given area, square has the largest perimeter
58	$e^{\pi}<\pi^{e}$
59	For $x\in\left(0,\frac{\pi}{2}\right),\ \sin x<x<\tan x$
60	There is a unique real number $x>0$ such that $\left(\frac{1}{4}\right)^{x}=x=\log_{1/4}x$.
61	The function $f(x)=x^{\frac{1}{x}}$ is decreasing on (1,e) and increasing on (e, ∞).
62	Let f(x) and g(x) be defined and differentiable for x≥x_0 and f(x_0) = g(x_0), f'(x)>g'(x) for x> x_0. Then f(x) > g(x) for x>x_0.
63	The interval on which y = x^2 e^{-x} increases in (-2, 0).
64	Let h(x) = f(x) – $(f(x))^2$ + $(f(x))^3$, $x \in R$. Then h is increasing whenever f is increasing.
65	F(x) = x – [x] is strictly increasing on (0, 1).
66	At (0,0), the curve $y^2 = x^3 + x^2$ makes and angle of 60^0 with the x-axis.
67	The curve y – e^{xy} + x = 0 has a vertical tangent at the point (1, 0).
68	The equation of the tangent to the parabola y^2 = 4ax at (x_1, y_1) is $yy_1 = 2a(x + x_1)$.
69	The angle of intersection of the curves y = x^2 and 6y = 7 – x^3 at (1,1) is Π/4.
70	A student wants to draw a straight line which touches the parabolic curve y = $(x - 3)^2$ at a specific point say (2, 1). The equation of the line is 2x + y = 5.
71	The slope of tangent to the curve $y=x^2+3$ at x=1 is $\frac{-1}{2}$(True/False)
72	The slope of the normal to the curve $y=3x^2+2$ at x = 2 is 12 (True/False)
73	The points on the curves $\frac{x^2}{25}+\frac{y^2}{4}=1$ at which the tangent is parallel to x – axis is $(0,\pm 2)$(True/False)

74	The slope of normal to the curve $x = a(t - sint), y = a(1 - cost)\ at\ t = \frac{\pi}{2}$ is -1 (True/False)
75	Function $f(x) = logx$ is increasing on $\boldsymbol{R}$, if x<1 (True/False) 0<x<1 (b) x>1 (c)x<1 (d) x>0
76	The point on the curve $y = x^2 - 3x + 2$ where tangent is perpendicular to $y = x$ is (1,0) (True/False)
77	On the ellipse $4x^2 + 9y^2 = 36$, the points at which the tangent is parallel to the line $8x = 9y$ are $\left(\frac{2}{5}, \frac{1}{5}\right) or \left(\frac{1}{5}, \frac{2}{5}\right)$(True/False)
78	The equation of the normal to the curve $y = x(2 - x)$ at point (2,0) is $x - 2y = 2$(True/False)
79	If the line $y = mx + 1$ is a tangent to curve$y^2 = 4x$, then value of m is 1 (True/False)
80	The equation of normal to the curve $y = tanx\ at\ (0,0)$ is x+y=0……..(True/False)
81	The value of a for which the function $f(x) = sinx - ax + b$ increases in R are… $(-\infty, -1)$…… (True/False)
82	The tangent to the curve $y = e^{2x}$ at point (0,1) meets x – axis at $\left(\frac{-1}{2}, 0\right)$ (True/False)
83	The abscissa of the point on the curve $3y = 6x - 5x^3$, the normal at which passes through the origin is 2 (True/False)
84	The slope of the tangent to the curve $y^2e^{xy} = 9e^{-3}x^2$ at (-1,3) is 10 (True/False)
85	The function $x^5 - 5x^4 + 5x^3 - 1$ is Neither maxima nor minima at x = 0 (True/False)
86	The adjacent sides of a rectangle with given perimeter as 100cm and enclosing maximum area are 10cm and 40cm (True/False)
87	The necessary condition to be maximum or minimum for the function is $f'(x) = 0$ and it not sufficient (True/False)
88	The area of a rectangle will be maximum for the given perimeter, when the rectangle is a Parallelogram (True/False)
89	Of the given perimeter, the triangle having maximum area is Equilateral triangle (True/False)
90	The sufficient conditions for the function $f: R \to R$is to be maximum at x = a, will be $f'(a) = 0\ and\ f''(a) < 0$(True/False)
91	36 factorize into two factors in such a way that sum of factors is minimum, then the factors are(2, 18) (True/False)
92	If $f(x) = 2x^3 - 3x^2 - 12x + 5$ and $x \in [-2, 4]$, then the maximum value of function is at the following value of x is 2 (True/False)
93	If $f(x) = 2x^3 - 21x^2 + 36x - 30$, then which one of the following is correct $f(x)$ has maximum at $x = 1$(True/False)
94	The maximum value of $2x^3 - 24x + 107$ in the interval $[-3, 3]$ is 75 (True/False)
95	If from a wire of length 36 metre a rectangle of greatest area is made, then its two adjacent sides in metre are (9, 9)

ANSWERS

1	T	11	F	21	F	31	T	41	T	51	T	61	F	71	F	81	T	91	F
2	F	12	F	22	T	32	F	42	F	52	F	62	T	72	F	82	T	92	F
3	F	13	F	23	T	33	F	43	T	53	F	63	F	73	T	83	F	93	T
4	F	14	T	24	F	34	F	44	T	54	T	64	T	74	T	84	F	94	F
5	T	15	F	25	F	35	T	45	F	55	F	65	T	75	F	85	T	95	T
6	F	16	T	26	T	36	T	46	T	56	T	66	F	76	T	86	F		
7	T	17	T	27	T	37	T	47	T	57	F	67	T	77	F	87	T		
8	T	18	T	28	F	38	T	48	T	58	F	68	T	78	T	88	F		
9	F	19	T	29	F	39	T	49	T	59	T	69	F	79	T	89	T		
10	T	20	T	30	T	40	F	50	F	60	T	70	T	80	T	90	T		

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