# CHAPTER 5

# CONTINUITY AND DIFFRENTIABILITY

## MULTIPLE CHOICE QUESTIONS

Q1. The derivative of $2x + y = \sin y$ is :

(A) $\frac{2}{\cos y}$

(B) $\frac{2}{\cos y + 3}$

(C) $\frac{2}{\cos y - 3}$

(D) None of these.

Q2. If $\sin x + y = \log x$, then $\frac{dy}{dx}$ is equal to :

(A) $\frac{1-x}{x \sin y}$

(B) $\frac{1-x}{x \cos y}$

(C) $\frac{1+x}{x \cos y}$

(D) None of these.

Q3. If $2x + 3x = \sin x$, then $\frac{dy}{dx}$ is equal to :

(A) $\frac{\cos x+2}{3}$

(B) $\frac{\cos x-2}{3}$

(C) $\cos x + 2$

(D) None of these.

Q4. If $y = \sqrt{\sin x + y}$, then $\frac{dy}{dx}$ is equal to :

(A) $\frac{\cos x}{2y-1}$

(B) $\frac{\cos x}{1-2y}$

(C) $\frac{\sin x}{1-2y}$

(D) $\frac{\sin x}{2y-1}$

Q5. If $\cos y = x \cos(a + y)$ with $\cos \alpha = 1$, then $\frac{dy}{dx}$ is equal to :

(A) $\frac{\sin^2(a+y)}{\sin a}$

(B) $\frac{\cos^2(a+y)}{\sin a}$

(C) $\sin^2(a+y)\sin\alpha$

(D) None of these.

Q6. If $y^x = e^{y-x}$, then $\frac{dy}{dx}$ is equal to :

(A) $\frac{1+\log y}{y\log y}$

(B) $\frac{(1+\log y)^2}{y\log y}$

(C) $\frac{1+\log y}{(\log y)^2}$

(D) $\frac{(1+\log y)^2}{\log y}$

Q7. If $x = e^{x-y}$ then $\frac{dy}{dx}$ is equal to

(A) $\frac{x-y}{x\log x}$

(B) $\frac{y-x}{\log x}$

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

(D) $\frac{x-y}{\log x}$

Q8. If $x = at^2$ and $y = 2at$, then $\frac{dy}{dx}$ is equal to :

(A) t

(B) $\frac{1}{t}$

(C) $\frac{-1}{t^2}$

(D) None of these.

Q9. If $x = a(\cos\theta + \theta\sin\theta$ and $y = a(\sin\theta - \theta\cos\theta)$, then $\frac{dy}{dx}$ is equal to :

(A) $\tan\theta$

(B) $\cos\theta$

(C) $\sin\theta$

(D) $\cot\theta$

Q10. The derivative of $\cos^{-1}(2x^2-1)$ w.r.t $\cos^{-1}x$ is :

(A) 2

(B) $\frac{-1}{2\sqrt{1-x^2}}$

(C) $\frac{2}{x}$

(D) $1-x^2$.

Q11. The derivative of $\sin^2 x$ w. r. t $e^{\cos x}$ is:

(A) $\frac{2\cos x}{e^{\cos x}}$

(B) $-\frac{2\cos x}{e^{\cos x}}$

(C) $\frac{2}{e^{\cos x}}$

(D) None of these.

Q12. If $y = \cos^{-1} x$ , then derivative of $\frac{d^2y}{dx^2}$ in term of y alone is :

(A) – cot y $\text{cosec}^2$ y

(B) cosec y $\cot^2$ y

(C) coty cosec y

(D) None of these.

Q13. If $y = \log_a x + \log_x a + \log_a a$ , then $\frac{dy}{dx}$ is equal to :

(A) $\frac{1}{x} + x \log a$

(B) $\frac{\log a}{x} + \frac{x}{\log x}$

(C) $\frac{1}{x \log a} + x \log a$

(D) $\frac{1}{x \log a} + \frac{\log a}{x(\log x)^2}$

Q14. If $y = (\tan x)^{\sin x}$ , then $\frac{dy}{dx}$ is equal to :

(A) $\sec x + \cos x$

(B) $\sec x + \log \tan x$

(C) $(\tan x)^{\sin x}$

(D) None of these.

Q15. If $x = f(t) \text{and } y = g(t)$ then $\frac{d^2y}{dx^2}$ is equal to :

(A) $\frac{g'(t)'}{f'(t)}$

(B) $\frac{g''(t)f'(t) - g'(t)f''(t)}{[g'(t)]^3}$

(C) $\frac{g''(t)f'(t) - g'(t)f''(t)}{[g'(t)]^2}$

(D) None of these.

Q16 If $y = Ae^{5x} + Be^{-5x}$ , then $\frac{d^2y}{dx^2}$ =

(A) 25y (B) 5y (C) -25y (D) 15y

Q17 If $x = t^2$ and $y = t^3$ then $\frac{d^2y}{dx^2}$ =

A)$\frac{3}{2}$ (B)$\frac{3}{4t}$ (C)$\frac{3}{2t}$ (D)$\frac{3}{4}$

Q18 If $y= x^{x^2}$ then $\frac{dy}{dx}$ =

(A) )$x^{X^2+1}$ (B)$x^{X^2+1}$(1+2 log x) (c) (1+2 log x) (D) $x^2 + 1$

Q19 If $y =(\sin x)^x$ then $\frac{dy}{dx}$ =

(A)$(\sin x)^x$ (B) (x cot x + log sin x) (c) $(\sin x)^x$ (x cot x + log sin x) (D)$(\sin x)^x$ (cot x + log sin x)

Q20 . If x= 4t , y= 4/t then $\frac{dy}{dx}$

A)$-\frac{1}{t^2}$ (B)$t^2$ (C) )$\frac{1}{t^2}$ (D) $-\frac{1}{t^3}$

Q21 .If x= log t , y= sint t then $\frac{dy}{dx}$

(A) sint (B) t sint (C) cost (D) t cost

Q22 .If x= a secθ , y=b tanθ then $\frac{dy}{dx}$

(A) $\frac{b}{a}$ cosec θ (B) cosec θ (C) $-\frac{b}{a}$ cosec θ (D) sec θ

Q23 If $y=4x^3 + x +7$ then $\frac{d^2y}{dx^2}$ =

(A) 12x (B) 24x (C ) 24 (D) 12

Q24 .If y= log x then $\frac{d^2y}{dx^2}$ =

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

Q25 $y= \cos^2 x + 3x$ then $\frac{d^2y}{dx^2}$ =

A) 3x (B) cos2x (C) 3cos2x (D) – 2cos2x

Q26 .$y=x^3 \log x$ then $\frac{d^2y}{dx^2}$ =

A) x(5+6 logx) (B) x (C) (5+6 logx) (D) log x

Q27 .If $4^{x+9}$ then $\frac{dy}{dx}$ =

(A) $4^{x+9}$ (B) $4^{x+9}$ log4 (C) log4

(D) log x +4

Q28 . If $\alpha^{\tan x}$then $\frac{dy}{dx}$ =

(A) $\alpha^{\tan x}$ (B) $\sec^2 x$ (C) $\sec^2 x \log \alpha$

(D)$\alpha^{\tan x} \sec^2 x \log \alpha$

Q29 If y=log log x then $\frac{d^2y}{dx^2}$ =

A) - $\frac{1+\log x}{(x\log x)^2}$ (B) $(x\log x)^2$ (C)$\frac{1+x}{(x\log x)^2}$ (D) 1+x

Q30 .If y= tan x + sec x then $\frac{dy}{dx}$

A) $\frac{x}{(1-\sin x)}$ (B) $\frac{\cos x}{(1-\sin x)}$ (C) $\frac{\cos x}{(1-\sin x)^2}$

D)$\frac{x}{(1-\sin x)^2}$

Q.31 The real function f is said to be continuous at x = a if

(a) f(a) exists (b) $\lim_{x\to a+} f(x) = \lim_{x\to a-} f(x)$ (c) $\lim_{x\to a} f(x) = f(a)$ (d) None of the above.

Q.32 Which of the following function is continuous?

(a) Modulus function (b) Signum function (c) Reciprocal function (d) Greatest Integer function

Q.33 The function defined by f(x) = $\begin{cases} x + 2, \text{ if } x > 0 \\ -x + 2, \text{if } x \le 0 \end{cases}$ is

(a) Continuous at x = 0 (b) Continuous in its domain (c)Discontinuous at x = 0
(d) Discontinuous in its domain.

Q.34 The point of discontinuity for the function f(x) = $\begin{cases} |x| + 3, \text{ if } x \le -3 \\ -2x, \text{ if } -3 < x < 3 \\ 6x + 2, \text{ if } x \ge 3 \end{cases}$ is

(a) x = 0, (b) x = -3, (c) x = 3 (d) x = -3, 3

Q.35 The value of k for which the function f(x) = $\begin{cases} kx + 5, \text{ if } x \le 2 \\ x - 1, \text{if } x > 2 \end{cases}$ is continuous at x = 2 is

(a) 5 (b) 0 (c) -1 (d) -2

Q.36 For what values of a and b, the function f(x) = $\begin{cases} \frac{1-\sin^3 x}{3\cos^2 x}, \text{ if } x < \frac{\pi}{2} \\ a, \text{ if } x = \frac{\pi}{2} \\ \frac{b(1-\sin x)}{(\pi-2x)^2}, \text{ if } x > \frac{\pi}{2} \end{cases}$ is continuous at x =

$\frac{\pi}{2}$

(a) a = ½, b = 4 (b) a = 2, b = ¼ , (c) a = 1, b = 4, (d) a = 4, b = ½.

Q.37 Which of the following function is continuous at x = 1 ?

(a) Signum function (b) f(x) = x + [x] (c) f(x) = x – [x] (d) Modulus function

Q.38 The point of discontinuity for the function f(x) = $\begin{cases} \frac{1-\cos x}{x^2}, \text{ if } x \neq 0 \\ \frac{1}{2}, \text{ if } x = 0 \end{cases}$ is

(a) x = 0, (b) x = 1, (c) x = ½ (d) No point of discontinuity .

Q.39 Derivative of $x^{-3}$ (5 + 3x) with respect to x :

(a) $-\frac{3(5+2x)}{x^4}$ (b) $(5+3x)^{-3}$ x (c) $-\frac{3x^4}{(5+2x)}$ (d) None of the above.

Q.40 Derivative of $x^5$ $(3 - 6x^{-9})$ with respect to x :

(a) $(3 - 6x^{-9})^5 x^{-1}$ (b) $\frac{15x^9+24}{x^5}$ (c) $15x^4 + 24 x^{-5}$ (d) None of these

Q.41 Derivative of $\sqrt{ax^2+bx+c}$ with respect to x :

(a) ½ ($\sqrt{ax^2+bx+c}$) (b) $(ax^2+bx+c)^{3/2}$ (c) 3/2 $(ax^2+bx+c)^{3/2}$ (d) $\frac{2ax+b}{2\sqrt{ax^2+bx+c}}$

Q.42 Derivative of $\sqrt{\frac{1-\tan x}{1+\tan x}}$ with respect to x :

(a) $\frac{-\sec^2\left(\pi/4-x\right)}{2\sqrt{\tan\left(\pi/4-x\right)}}$ (b) $\frac{3}{2}\left(\frac{1-\tan x}{1+\tan x}\right)^{3/2}$ (c) $\frac{1}{2}\left(\frac{1+\tan x}{1-\tan x}\right)^{3/2}$ (d) None of these

Q.43 Derivative of $\frac{1}{\sqrt{a^2-x^2}}$ with respect to x :

(a) $\frac{-2x}{\sqrt{a^2-x^2}}$ (b) $\frac{x}{\left(a^2-x^2\right)^{3/2}}$ (c) $\frac{-2x}{\left(a^2-x^2\right)^{3/2}}$ (d) None of these

Q.44 Derivative of $\sin\left(\sqrt{\sin x+\cos x}\right)$ with respect to x :

(a) $\cos\left(\sqrt{\sin x+\cos x}\right)$ (b) $\sin\left(\sqrt{\sin x-\cos x}\right)$

(c) $\dfrac{(\cos x-\sin x)\cos\left(\sqrt{\sin x+\cos x}\right)}{2\sqrt{\sin x+\cos x}}$ (d) None of these

Q.45 Derivative of $\sin\left(\sqrt{\sin\sqrt{x}}\right)$ with respect to x :

(a) $\dfrac{\cos\left(\sqrt{\sin\sqrt{x}}\right)\left(\sin\sqrt{x}\right)}{4\sqrt{\sin\sqrt{x}}}$ (b) $\dfrac{\sin\left(\sqrt{\sin\sqrt{x}}\right)\left(\cos\sqrt{x}\right)}{4\sqrt{x}\sqrt{\cos\sqrt{x}}}$ (c) $\dfrac{\sin\left(\sqrt{\sin\sqrt{x}}\right)\left(\sin\sqrt{x}\right)}{4\sqrt{x}\sqrt{\cos\sqrt{x}}}$ (d) $\dfrac{\cos\left(\sqrt{\sin\sqrt{x}}\right)\left(\cos\sqrt{x}\right)}{4\sqrt{x}\sqrt{\sin\sqrt{x}}}$

Q46 If y = log sin x , then $\frac{dy}{dx}$ is equal to

(a) cos x
(b) tan x
(c) cot x
(d) - cot x

Q47 If y = $e^{\sqrt{2x}}$, then $\frac{dy}{dx}$ is equal to

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

Q48 If y = $e^{ax}$ cos ( bx + c ), then $\frac{dy}{dx}$ is equal to

(a)$e^{ax}$ {b sin (bx + c ) + a cos x ( bx + c )
(b) $e^{ax}$ { - b sin (bx + c ) + a cos x ( bx + c )
(c ) $e^{ax}$ {b sin (bx + c ) - a cos x ( bx + c )
(d ) $e^{ax}${b sin (bx - c ) + a cos x ( bx - c )

Q49 If y = log ( cos $x^2$ ) , then $\frac{dy}{dx}$ is equal to

(a)2 x tan $x^2$
(b) x tan $x^2$
(c) - 2 x tan $x^2$
(d) - x tan $x^2$

Q50 If y = log √((x-1)/(x+1)) , then dy/dx is equal to

(a )1/(x2 – 1)

( b) 1/(x2 + 1)
(c ) - 1/(x2 – 1)
( d ) - 1/(x2 + 1)

Q51 If $y = x^x$, then $\frac{dy}{dx}$ is equal to
(a)$x^x$
(b)$x^x$ ( 1 + log x )
( c ) $x^x$ ( 1 - log x )
(d ) $x^x$ ( 1 + x )

Q52 If $y = (\sin x)^{\cos x}$, then $\frac{dy}{dx}$ is equal to
(a)$e^{\sin x \,.\, \log \sin x}$
(b)$e^{\sin x \,.\, \log \cos x}$
(c )$e^{\cos x \,.\, \log \sin x}$
(d )$e^{\cos x \,.\, \log \cos x}$

Q53 If $x^y = y^x$, then $\frac{dy}{dx}$ is equal to
(a ) $\frac{x}{y}\left[\frac{x \log y - y}{y \log x - x}\right]$
(b) $\frac{y}{x}\left[\frac{x \log y - y}{y \log x - x}\right]$
(c ) $\frac{y}{x}\left[\frac{y \log x - y}{x \log y - x}\right]$
( d ) $\frac{y}{x}\left[\frac{x \log y - x}{y \log x - y}\right]$

Q54 If $x = a\{\cos t + \frac{1}{2}\log \tan^2\frac{t}{2}\}$ and y = a sin t , then $\frac{dy}{dx}$ is equal to
(a ) sin t
( b ) cos t
( c ) tan t
( d ) sec t

Q55 If x = a ( 2 θ– sin 2θ ) , y = a ( 1– cos 2θ ) and
$\theta = \frac{\pi}{3}$ , then $\frac{dy}{dx}$ is equal to
(a) $-1/\sqrt{3}$
(b) $\sqrt{3}$
( c ) $1/\sqrt{3}$
( d ) $-\sqrt{3}$

Q56 If x = a sin2t( 1 + cos 2t) , y = b cos 2t ( 1– cos 2t) and $t = \frac{\pi}{4}$ , then $\frac{dy}{dx}$ is equal to
(a ) a/b
(b) b/a
( c ) $1/\sqrt{2}$
( d ) $-1/\sqrt{2}$

Q57 If $x = (1 + \log t)/t^2$ , $y = (3 + 2 \log t)/t$ , then $\frac{dy}{dx}$ is equal to
(a)t
(b) $t^2$
(c) 1/t

(d) $-1/t^2$

Q58 If $x = e^{\cos 2t}$ and $y = e^{\sin 2t}$ then $\frac{dy}{dx}$ is equal to

(a) $\frac{y \log x}{x \log y}$

(b) $-\frac{y \log x}{x \log y}$

(c ) $\frac{x \log y}{y \log x}$

(d) $-\frac{x \log y}{y \log x}$

Q59 If $x = a \sec^3 A$ and $y = a \tan^3 A$ then $\frac{dy}{dx}$ at $A = \frac{\pi}{3}$ is equal to

(a) $\frac{\sqrt{3}}{2}$

(b) - ) $\frac{\sqrt{3}}{2}$

( c ) $1/\sqrt{3}$

(d ) $1/\sqrt{3}$

Q60 If $x = 10 ( t - \sin t)$ , $y = 12 ( 1 - \cos t)$ , then $\frac{dy}{dx}$ is equal to

(a ) $\frac{6}{5} \cot (\frac{t}{2})$

(b) - $\frac{6}{5} \cot (\frac{t}{2})$

( c ) $\frac{5}{6} \cot (\frac{t}{2})$

( d ) - $\frac{5}{6} \cot (\frac{t}{2})$

Q61 We know that $\log_a b = \log_e b \times \log_a e$. Using it find the derivative of the function $\log_{10} x$

(a) $\frac{1}{x}$

(b) $\frac{1}{x} \times \log_e 10$

(c) $\frac{1}{x} \times \log_{10} e$

(d) $\frac{1}{10x}$

Q62 If $y = e^{\log x^2}$, then find $\frac{dy}{dx}$

(a) $\frac{1}{x^2}$

(b) $e^{\log x^2} \times 2x$

(c) $e^{\log x^2} \times \frac{1}{x^2}$

(d) 2x

Q63 Find the derivative of the function f(x) = $\sqrt{e^{\sqrt{x}}}$ with respect to x

(a) $e^{\sqrt{x}} \times \frac{1}{2\sqrt{x}}$

(b) $\frac{e^{\sqrt{x}}}{2\sqrt{e^{\sqrt{x}}}}, x > 0$

(c) $\frac{e^{\sqrt{x}}}{2\sqrt{xe^{\sqrt{x}}}}, x > 0$

(d) $\frac{e^{\sqrt{x}}}{4\sqrt{xe^{\sqrt{x}}}}, x > 0$

Q64 If $y = \log\log x, x > 1$, then find $\frac{dy}{dx}$

(a) $\frac{1}{\log x}$

(b) $\frac{1}{\log(\log x)}$

(c) $\frac{1}{\log x} \times \frac{1}{x}$

(d) $\frac{1}{x}$

Q65 If $y = (\log x)^{\cos x}$, then find $f'(x)$

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

(b) $(\log x)^{\cos x}\left[\frac{\cos x}{x\log x} - \sin x\log(\log x)\right]$

(c) $\cos x\,(\log x)^{\cos x-1} \times (-\sin x) \times \frac{1}{x}$

(d) $(\log x)^{\cos x}\left[\frac{\cos x}{x\log x} + \sin x\log(\log x)\right]$

Q66. If $f(x) = (1 + x)(1 + x^2)$ then find the value of $f'(1)$

.

(a) 4

(b) 6

(c) 2

(d) 1

Q67. Find the derivative of $y = \log\sqrt{x}$ with respect to y

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

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

(c) $\frac{1}{2x}\frac{dy}{dx}$

(d) $\frac{1}{2x}\frac{dx}{dy}$

Q68 Find $\frac{dy}{dx}$, if $x = a\cos t, y = a\sin t$ where t is the parameter

(a) $\sin t$

(b) $-\cos t$

(c) $-\cot t$

(d) $\tan t$

Q 69 If $x = 2at^2, y = at^3$ then find $\frac{dx}{dy}$ at $t = 2$

(a) $\frac{4}{3}$
(b) $\frac{2}{3}$
(c) $\frac{1}{4}$
(d) $\frac{3}{4}$

Q 70 $\frac{dy}{dx} = -\frac{y}{x}$ is not valid for which following parametric equation.

(a) $x = \sqrt{a^{\sin^{-1}t}}, y = \sqrt{a^{\cos^{-1}t}}$
(b) $x = \sqrt{a^{\cos^{-1}t}}, y = \sqrt{a^{\sin^{-1}t}}$
(c) $x = a^{\cos^{-1}t}, y = a^{-\sin^{-1}t}$
(d) $x = a^{\cos^{-1}t}, y = a^{\sin^{-1}t}$

Q71. If $x = \sin t, y = \cos 2t$ then the value of $\frac{dy}{dx}$ is equal to
.
(a) $4x$
(b) $-4x$
(c) $4y$
(d) -4y

Q72. Find $\frac{d^2y}{dx^2}$, if $y = e^x \cos 3x$

(a) $e^x(\cos 3x - \sin 3x)$
(b) $e^x(\cos 3x - 3\sin 3x)$
(c) $e^x(\sin 3x - \cos 3x)$
(d) $e^x(\cos 3x + 3\sin 3x)$

Q73. $y = 5\cos x + 3\sin x$ satisfy which of the following second order derivative equation

(a) $\frac{d^2y}{dx^2} - y = 0$
(b) $\frac{d^2y}{dx^2} + y = 0$
(c) $\frac{d^2y}{dx^2} - \frac{dy}{dx} = 0$
(d) $\frac{d^2y}{dx^2} + \frac{dy}{dx} = 0$

Q 74. If $y = \cos^{-1}x$, find $\frac{d^2y}{dx^2}$ in terms of y alone

(a) $-\text{coty cosec}^2 y$

(b) $\text{coty cosec}^2\text{y}$
(c) $\text{tany cosec}^2\text{y}$
(d) $-\text{coty sec}^2\text{y}$

Q 75 If $y = \cos^{-1}x$, then which of the following is true?

(a) $(1+x^2)y_2 - xy_1 = 0$
(b) $(1-x^2)y_2 + xy_1 = 0$
(c) $(1+x^2)y_2 + xy_1 = 0$
(d) $(1-x^2)y_2 - xy_1 = 0$

Q76.If f(x) = $\begin{cases} ax+b, & 1 \le x < 5 \\ 7x-5, & 5 \le x < 10 \\ bx+3a, & x \ge 10 \end{cases}$ is continuous then the value of a and b is respectively

a) 5 , 10 b) 5 , 5 c) 10 , 5 d) 0 , 0

Q77. If f(x) = $\begin{cases} x, & x \in (0,1) \\ 1, & x \ge 1 \end{cases}$ then ,

a) f(x) is continuous at x = 1 only
b) f(x) is discontinuous at x = 1 only
c) f(x) is continuous on $R^+$
d) f(x) is not defined for x = 1

Q78. If $x = at^2$, $y = 2at$ then $\frac{dy}{dx}$ = ……, where $t \neq 0$

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

Q79. The value of k ($k < 0$) for which the function f defined as

f(x) = $\begin{cases} \frac{1-\cos kx}{x \sin x}, & x \neq 0 \\ \frac{1}{2}, & x = 0 \end{cases}$ is continuous at x = 0 is

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

Q80. If $e^x + e^y = e^{x+y}$, then $\frac{dy}{dx}$ is

a) $e^{y-x}$ b) $e^{x+y}$ c) $-e^{y-x}$ d) $2e^{x-y}$

Q81 If y = log ( $\text{cose}^x$ ), then $\frac{dy}{dx}$ is

a)$\cos e^{x-1}$ b) $e^{-x}\cos e^x$ c) $e^x \sin e^x$ d) $-e^x \tan e^x$

Q82. The derivative of $\sin^{-1}(2x\sqrt{1-x^2})$wrt $\sin^{-1}x$, $\frac{1}{\sqrt{2}} < x < 1$, is

a) 2 b) $\frac{\pi}{2} - 2$ c) $\frac{\pi}{2}$ d) – 2

Q83. The point (s) at which the function f given by f(x) = $\begin{cases} \frac{x}{|x|}, & x < 0 \\ -1, & x \geq 0 \end{cases}$ is continuous, is/are

a)x∈ R b) $x = 0$ c) $x \in R - \{0\}$ d) $x = -1$ and $1$

Q84. If y = log ($\frac{1- x^2}{1+ x^2}$), then $\frac{dy}{dx}$ is equal to

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

Q 85. If f(x) = $\begin{cases} mx + 1 \text{ if } & x \leq \frac{\pi}{2} \\ \sin x + n \text{ if } & x > \frac{\pi}{2} \end{cases}$ is continuous function at x = $\frac{\pi}{2}$, then

a)m = 1, n = 0 b) m = $\frac{n\pi}{2} + 1$ c) n = $\frac{m\pi}{2}$ d) m = n = $\frac{\pi}{2}$

Q86. The derivative of $\cos^{-1}( 2x^2 - 1 )$ wrt $\cos^{-1} x$ is

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

Q87 $\frac{d}{dx}(\sqrt{x \sin x}\ )$ where 0< $x < \pi$ is

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

Q88. $\frac{d}{dx}( \tan^{-1} x + \cot^{-1} x )$ is

a) 0 b) $\frac{1}{1+ x^2}$ c) $\frac{-1}{1+ x^2}$ d) Does not exist

Q89. If 2t = $v^2$ then $\frac{dv}{dt}$ is

a) 0 b) $\frac{1}{v}$ c) $\frac{1}{2}$ d) $\frac{-1}{v^2}$

Q90 Let f(x) = $\begin{cases} x \sin\frac{1}{x}, & \text{when } x \neq 0 \\ 0, & \text{when } x = 0 \end{cases}$. Then

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

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

Q91 Find the derivative of $e^{x^3}$

(A) $3x^2e^{x^3}$

(B) $x^3e^{x^3-1}$

(C) $e^{x^3}$

(D) $3x^2 + e^{x^3}$

Q92. Find the derivative of $x^2e^x$

(A) $2xe^x$

(B) $2x + e^x$

(C) $2xe^x + x^2e^x$

(D) $x^2 + e^x$

Q93 Find the derivative of $a^x$

(A) $a^x$

(B) $a$

(C) $\frac{a^x}{\log a}$

(D) $a^x \log a$

Q94. Find the derivative of $\log_a x$

(A) 0

(B) $\log_e x$

(C) $\frac{1}{x}$

(D) $\frac{1}{x}\log_e a$

Q95. Find the derivative of $x = \sin t$ and $y = \cos t$

(A) $\tan t$

(B) $\cot t$

(C) $-\tan t$

(D) $-\cot t$

Q96.. Find the derivative of $\log_e x$

(A) $\frac{1}{x}$

(B) $\log_a x$

(C) $\frac{1}{x}\log_a e$

(D) $\frac{1}{a}\log_e x$

Q97.. Find the second derivative of $xe^x$

(A) $xe^x$

(B) $x + e^x$

(C) $1 + e^x$

(D) $(x + 1)e^x$

Q98. Find the derivative of $a^{2\log_a x}$

(A) $2x$

(B) $\frac{a}{x}$

(C) $x^2$

(D) $a^x$

Q99. Find the derivative of $\log_e(x^2 + x)$

(A) $\frac{1}{2x+1}$

(B) $\frac{x^2+x}{2x+1}$

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

(D) $\frac{2x+1}{x^2+x}$

Q100 If $y = 10^{10^x}$, then $\frac{dy}{dx}$, is

(A) $10^{10^x}(\log 10)$

(B) ) $10^{10^x}(\log 10)^2$

(C) $10^{10^x}10^x(\log 10)^2$

(D) $10^{10^x}10^x(\log 10)$

Q101. If $\sin(x + y) = \log(x + y)$, then find the value of $\frac{dy}{dx}$

(A) $2$

(B) $-2$

(C) $1$

(D) $-1$

Q102. Find the second derivative of $y = x^3 + \tan x$

(A) $6x + 2\sec^2 x \tan x$

(B) $3x^2 + \sec^2 x$

(C) $6x - 2\sec^2 x \tan x$

(D) $3x^2 - \sec^2 x$

Q103 Find the derivative of $\sqrt{e^{\sqrt{x}}}$

(A) $\frac{e^{\sqrt{x}}}{4\sqrt{xe^{\sqrt{x}}}}$

(B) $\frac{e^{\sqrt{x}}}{4\sqrt{e^{\sqrt{x}}}}$

(C) $\frac{e^{\sqrt{x}}}{\sqrt{xe^{\sqrt{x}}}}$

(D) $\frac{1}{\sqrt{xe^{\sqrt{x}}}}$

Q104. Find the derivative of $e^{\sin^{-1}x}$

(A) $\frac{e^{\sin^{-1}x}}{\sqrt{1-x^2}}$

(B) $\frac{e^{\cos^{-1}x}}{\sqrt{1-x^2}}$

(C) $\frac{e^{\sin^{-1}x}}{\sqrt{1+x^2}}$

(D) $-\frac{e^{\sin^{-1}x}}{\sqrt{1-x^2}}$

Q105. Find the derivative of $\sin(\log x)$

(A) $\frac{\cos(\log x)}{x}$

(B) $\frac{\sin(\log x)}{x}$

(C) $\cos(\log x)$

(D) $\sin\left(\frac{1}{x}\right)$

Q106. $\frac{d}{dx}e^{e^x}$ is equal to

(a) $\frac{e^{e^x}}{e^{e^x}}$

(b) $e.e^x$

(c) $\frac{e^{e^x}}{e^x}$

(d) $e^{e^x}.e^x$

Q107 If $y=5^x$ ,then $\frac{dy}{dx}$ is

(a) $X.5^{x-1}$

(b) $\frac{5^x}{\log 5}$

(c) $5^x.\log 5$

(d) $\frac{5^x}{(\log 5)^2}$

Q108 If y =log(sec x +tanx) ,then $\frac{dy}{dx}$ is

(a) tanx

(b) cot x

(c) cosec x

(d) sec x

Q109. If y =log $\sqrt{\frac{1-\cos x}{1+\cos x}}$, then $\frac{dy}{dx}$ is

(a) $\text{cosec}^2 x$

(b) $\text{cosec}\frac{x}{2}$

(c) $\text{cosec } x^2$

(d) cosec x

Q110. If y = log tan $(\frac{\pi}{4}+\frac{x}{2})$, then $\frac{dy}{dx}$ is

(a) sec x

(b) cosec x

(c) cos x

(d) tan x

Q111. $\frac{d}{dx}(\sqrt{\log x})$ is

(a) $\frac{2x}{\sqrt{\log x}}$

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

(c) $\frac{\sqrt{\log x}}{2x}$

(d) $2x.\sqrt{\log x}$

Q112. If y = log $\sqrt{\frac{1+\sin x}{1-\sin x}}$, then $\frac{dy}{dx}$ is

(a) sec x

(b) tan x

(c) cosec x

(d) cot x

If y=A cosnx+ B sin nx, then $\frac{d^2y}{dx^2}$ =

(a) $n^2y$

Q113.

(b) -y

(c) $-n^2y$

(d) none of these

Q114. If sin(x+y ) =log(x+y ) , then $\frac{dy}{dx}$ is

(a) 2

(b) -2

(c) 1

(d) -1

Q115. If x = a cost, y= b sint, then $\frac{dy}{dx}$ is

(a) $\frac{b}{a}$tan t

(b) $-\frac{b}{a}$tan t

(c) $\frac{b}{a}$cot t

(d) $-\frac{b}{a}$cot t

Q116. If $x = at^2$, $y = 2at$ then $\frac{dy}{dx}$ equals to

a) $\frac{-1}{t^2}$

b) $\frac{1}{t^2}$

c) $\frac{1}{t}$

d) $\frac{-1}{t}$

Q117. If $x = asin2t(1 + cos2t)$ and $y = bcos2t(1 - cos2t)$,then $dy/dx$ at $t = \pi/4$ is

a) $-b/a$

b) $a/b$

c) $b/a$

d) None of these

Q118. If $y = \log x^x$ ,then the value of $\frac{dy}{dx}$is

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

b) $\log_e(ex)$

c) log e/x

d) log x/e

Q119. If $x = t^2$ and $y = t^3$then $\frac{d^2y}{dx^2}$is equal to

a) 3/2

b) 3/4t

c) 3/2t

d) 3/4

Q120 The function f: R → R given by f(x)= - | x-1| is

a. continuous as well as differentiable at x=1
b. non continuous but differentiable at x=1
c. continuous but not differentiable at x=1
d. neither continuous nor differentiable at x=1

Q121 The function f(x) = $e^{|x|}$ is

a. continuous everywhere but not differentiable at x=0
b. continuous differentiable everywhere
c. not continuous at x=0
d. none of these

Q122 The function f(x)=[x], where [x] denotes the greatest integer function, is continuous at

a. 4
b. -2
c. 1
d. 1.5

Q123 The number of the points at which of the function f(x)= $\frac{1}{x-[x]}$ is not continuous is

a. 1
b. 2
c. 3
d. none of these

Q124 The function $f(x) = \begin{cases} \frac{\sin x}{x} + \cos x, & if\ x = 0 \\ k, & if\ x = 0 \end{cases}$ is continuous at x=0 , then the value of k is

a. 3
b. 2
c. 1
d. 1.5

Q125. The value of k which makes the function defined by $f(x) = \begin{cases} \sin \frac{1}{x}, & if\ x \neq 0 \\ k, & if\ x = 0 \end{cases}$ , continuous at x =0 is

a. 8
b. 1

c. -1
d. none of these

Q126. The function f(x)= cot x is discontinuous on the set

a. $\{x = n\,\pi : n \in Z\}$
b. $\{x = 2\,n\pi : n \in Z\}$
c. $\left\{x = (2n+1)\frac{\pi}{2} ; n \in Z\right\}$

$$\left\{x = \frac{n\pi}{2} ; n \in Z\right\}$$

Q127. Let f(x) = |sin x|. Then

a. f is everywhere differentiable
b. f is everywhere continuous but not differentiable at x=nπ, $n \in Z$
c. f is everywhere continuous but not differentiable at $x = (2n+1)\frac{\pi}{2} ; n \in Z$
d. none of these

Q128. The function f(x)= $\frac{x-1}{x(x^2-1)}$ is discontinuous at

a. exactly one point
b. exactly two point
c. exactly three point
d. no point

Q129. if f(x)= $x^2 \sin\frac{1}{x}$, where x≠0, then the value of the function f at x=0 , so that the function is continuous at x=0 , is

a. 0
b. -1
c. 1
d. none of these

Q130. The function f(x)= | x| + | x-1| is

a. continuous at x=0 as well as x=1
b. continuous at x=1 but not at x=0
c. discontinuous at x=0 as well as at x=1
d. continuous at x=0 but not at x=1

Q131 The function f(x)=$\frac{4-x^2}{4x-x^3}$ is

a. discontinuous at only one point
b. discontinuous at exactly two point
c. discontinuous at exactly three point
d. none of these

Q132 The set of points where the function f given by f(x)= | x-3| cos x is differentiable is

a. R
b. R - $\{3\}$

c. $(0,\infty)$
d. none of these

Q133 Different coefficient of $\sec(\tan^{-1}x)$ w.r.t. x is

a. $\frac{x}{\sqrt{1+x^2}}$
b. $\frac{x}{1+x^2}$
c. $x\sqrt{1+x^2}$
d. $\frac{1}{\sqrt{1+x^2}}$

Q134 If $u = \sin^{-1}\left(\frac{2x}{1+x^2}\right)$ and $v = \tan^{-1}\left(\frac{2x}{1-x^2}\right)$, then $\frac{du}{dv}$ is

a. $\frac{1}{2}$
b. x
c. $\frac{1-x^2}{1+x^2}\{4,-4\},\varphi$
d. $1$

Q135.The value of b for which the function $f(x) = \begin{cases} 5x-4, & 0 < x \le 1 \\ 4x^2+3bx, & 1 < x < 2 \end{cases}$ is continuous at every point of its domain is:

(a) - 1 (b) 0 (c) $\frac{13}{3}$ (d) 1

Q136.The point of discontinuity of the function $f(x) = \begin{cases} 2\sqrt{x}, & 0 \le x \le 1 \\ 4-2x, & 1 < x < \frac{5}{2} \\ 2x-7, & \frac{5}{2} \le x \le 4 \end{cases}$ is (are)

(a) x = 1, x = $\frac{5}{2}$ (b) x = $\frac{5}{2}$ (c) x = 1, $\frac{5}{2}$ , 4 (d) x = 0, 4

Q137.The set of points where the function $f(x)$ given by $f(x) = |x-3|\cos x$ is differentiable, is

(a) **R** (b) **R** – {3} (c) (0, ∞) (d) None of these

1. If $f(x) = \begin{cases} \frac{1}{1+e^{\frac{1}{x}}}, & x \neq 0 \\ 0, & x = 0 \end{cases}$, then $f(x)$ is
   (a) continuous as well as differentiable at x = 0
   (b) continuous but not differentiable at x = 0
   (c) differentiable but not continuous at x = 0
   (d) None of these

Q138. The function $f(x) = |\cos x|$ is :

(a) differentiable at x = (2n +1) $\frac{\pi}{2}$, n ∈ Z

(b) continuous but not differentiable at x = (2n +1) $\frac{\pi}{2}$, n ∈ Z

(c) differentiable for all x but not continuous at some x

(d) None of these

Q139. The function $f(x) = x - [x]$, where [x] denotes the greatest integer function is

(a) continuous at integer points only

(b) continuous everywhere

(c) continuous at non-integer points only

(d) differentiable everywhere

Q140 $\frac{d}{dx}[\log(x + \sqrt{x^2+1})]$

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

Q141.Differentiable coefficient of $\log_{10} x$ w.r.t. $\log_x 10$ is:

(a) $-\frac{(\log x)^2}{(\log 10)^2}$ (b) $\frac{(\log_{10} x)^2}{(\log 10)^2}$ (c) $\frac{(\log_x 10)^2}{(\log 10)^2}$ (d) $-\frac{(\log 10)^2}{(\log x)^2}$

Q142. $\frac{d}{dx}\left\{\cos^{-1}\left(\frac{1-x^2}{1+x^2}\right)\right\}$ is equal to

(a) $\frac{2}{1+x^2}$ (b) $\frac{-2}{1+x^2}$ (c) $\frac{2x}{|x|(1+x^2)}, x \neq 0$ (d) None of these

Q143. If $x^p y^q = (x+y)^{p+q}$, then $\frac{dy}{dx}$

(a) $\frac{x}{y}$ (b) $\frac{y}{x}$ (c) $\frac{x}{x+y}$ (d) $\frac{y}{y+x}$

Q144.Let $f(x) = \begin{cases} x+a, & a \geq 1 \\ ax^2+1, & x < 1 \end{cases}$, then $f$ is derivable at x = 1 if

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

Q145. Let $f(x) = \begin{cases} x^2, & x \leq 0 \\ ax, & x > 0 \end{cases}$, then $f$ is derivable at 0 if

(a) a = 0 (b) a = 1 (c) a ≠ 0 (d) None of these

Q146 The derivative of $cos^{-1}(2x^2-1)$ with respect to $cos^{-1} x$ is:

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

Q147.The function $f(x) = sin^{-1}(cos\ x)$ is:

(a) discontinuous at x = 0

(b) continuous at x = 0

(c) differentiable at x = 0

(d) None of these

Q149 Let $f(x) = \begin{cases} \frac{x-4}{|x-4|}+4, & x < 4 \\ a+b, & x = 4 \\ \frac{x-4}{|x-4|}+b, & x > 4 \end{cases}$. 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

Q150 If $y = e^{-2x+3}$ and $\frac{dy}{dx} = ky$, then k=--------

(A) 2

(B) -1

(C) -2

(D) $-2x + 3$

Q151 If $y = x^{x^{x^{\cdots\cdots\cdots\infty}}}$, then $\frac{dy}{dx} =$

(A) $\frac{y^2}{x(1-y\log x)}$

(B) $\frac{y}{x(1-y\log x)}$

(C) $\frac{y}{x(1+y\log x)}$

(D) $\frac{y^2}{x(1+y\log x)}$

Q152 If $y = e^{2\log\sin x}$, then $\frac{dy}{dx} =$

(A) $\cos^2 x$

(B) $e^{2\log\sin x}.\cos x$

(C) $\sin 2x$

(D) $\sin^2 x.\cos x$

Q153 Let $y = t^{10} + 1$ and $x = t^8 + 1$ then $\frac{d^2y}{dx^2}$ =

(A) $\frac{5}{2}t$

(B) $20t^8$

(C) $\frac{5}{16t^6}$

(D) $\frac{5}{16}t^6$

Q154 If $x^x = y^y$, then $\frac{dy}{dx}$ is equal to

(A) $\frac{-y}{x}$

(B) $\frac{-x}{y}$

(C) $1+\log\left(\frac{x}{y}\right)$

(D) $\frac{1+\log x}{1+\log y}$

Q155 If $y=(\tan x)^{\sin x}$, then $\frac{dy}{dx}$ is equal to

(A) $\sec x+\cos x$

(B) $\sec x+\log(\tan x)$

(C) $(\tan x)^{\sin x}$

(D) $(\tan x)^{\sin x}(\sec x+\cos x.\log(\tan x))$

Q156 If $x=10(t-\sin t)$ and $y=12(1-\cos t)$ then the value of $\frac{dy}{dx}$ at $t=\frac{2\pi}{3}$ is

(A) $\frac{2\sqrt{3}}{5}$

(B) $\frac{\sqrt{3}}{5}$

(C) $\frac{3\sqrt{3}}{5}$

(D) $\frac{3\sqrt{2}}{5}$

Q157 If $x=a\cos\theta+b\sin\theta$ and $y=a\sin\theta-b\cos\theta$ then $\frac{dy}{dx}=$

(A) $\frac{x}{y}$

(B) $\frac{-x}{y}$

(C) $\frac{y}{x}$

(D) $\frac{-y}{x}$

Q158 If $y=\sin(\log x)$, then $\frac{dy}{dx}=$

(A) $\sin(\log x)$

(B) $\cos(\log x)$

(C) $\dfrac{\sin(\log x)}{x}$

(D) $\dfrac{\cos(\log x)}{x}$

Q159 If $y = \log\left[x + \sqrt{x^2 + a^2}\right]$, then $\dfrac{dy}{dx} =$

(A) $\dfrac{-1}{\sqrt{x^2 + a^2}}$

(B) $\dfrac{2x}{\sqrt{x^2 + a^2}}$

(C) $\dfrac{1}{\sqrt{x^2 + a^2}}$

(D) $\dfrac{-2x}{\sqrt{x^2 + a^2}}$

Q160 If $y = A\sin x + B\cos x$, then

(A) $\dfrac{d^2y}{dx^2} = y$

(B) $\dfrac{d^2y}{dx^2} + y = 0$

(C) $\dfrac{d^2y}{dx^2} + \dfrac{dy}{dx} = 0$

(D) $\dfrac{dy}{dx} + y = 0$

Q161 If $y = 3e^{2x} + 5e^{3x}$, then identify the correct one

(A) $\dfrac{d^2y}{dx^2} + 5\dfrac{dy}{dx} + 6y = 0$

(B) $\dfrac{d^2y}{dx^2} + 5\dfrac{dy}{dx} - 6y = 0$

(C) $\dfrac{d^2y}{dx^2} - 5\dfrac{dy}{dx} - 6y = 0$

(D) $\dfrac{d^2y}{dx^2} - 5\dfrac{dy}{dx} + 6y = 0$

Q162 If $y = \sin^{-1} x$, then $(1-x^2)\frac{d^2y}{dx^2} =$

(A) $x\frac{dy}{dx}$

(B) $y\frac{dy}{dx}$

(C) $\frac{dy}{dx}$

(D) $-x\frac{dy}{dx}$

Q163 If $e^x(x+1) = 1$, then

(A) $\frac{d^2y}{dx^2} = \frac{dy}{dx}$

(B) $\frac{d^2y}{dx^2} = \left(\frac{dy}{dx}\right)^2$

(C) $\frac{d^2y}{dx^2} + \left(\frac{dy}{dx}\right)^2 = 0$

(D) $\frac{d^2y}{dx^2} + \left(\frac{dy}{dx}\right) = 0$

Q164 $\frac{d}{dx}\log_7 \log(x) =$

(A) $\frac{1}{\log 7 \log x}$

(B) $\frac{1}{x \log_7 x}$

(C) $\frac{1}{x \log x}$

(D) $\frac{1}{x \log 7 \log x}$

Q 165. The set of points where the function f given by f (x) = | 2x – 1| is differentiable is

(a) R

(b) R - {1/2}

(c) (0, ∞)

(d) None of these

# ANSWERS

| **Multiple Choice question** | |
|---|---|
| 1 | (C)$\frac{2}{cos\, y-3}$ |
| 2 | (B)$\frac{1-x}{x\, cos\, y}$ |
| 3 | (B)$\frac{cos\, x-2}{3}$ |
| 4 | (A)$\frac{cos\, x}{2y-1}$ |
| 5 | (B)$\frac{cos^2(a+y)}{sina}$ |
| 6 | (D)$\frac{(1+logy)^2}{log\ y}$ |
| 7 | (A)$\frac{x-y}{x\, log\, x}$ |
| 8 | (B)$\frac{1}{t}$ |
| 9 | (A)$tan\, \theta$ |
| 10 | (A) 2 |
| 11 | (B)$-\frac{2cosx}{e^{cosx}}$ |
| 12 | (A)$-cot\, y\, cosec^2\, y$ |
| 13 | (D)$\frac{1}{x\, log\, a}+\frac{log\, a}{x(log\, x)^2}$ |
| 14 | (D) None of these. |
| 15 | (B)$\frac{g''(t)f'(t)-g'(t)f''(t)}{[g'(t)]^3}$ |
| 16 | A |
| 17 | A |
| 18 | B |
| 19 | C |
| 20 | A |
| 21 | D |
| 22 | A |
| 23 | B |
| 24 | C |
| 25 | D |
| 26 | A |

| | |
|---|---|
| 27 | B |
| 28 | D |
| 29 | A |
| 30 | C |
| 31 | ( c) |
| 32 | (a ) |
| 33 | ( b) |
| 34 | (c) |
| 35 | (d) |
| 36 | (a) |
| 37 | (d) |
| 38 | (d) |
| 39 | (a) |
| 40 | (b) |
| 41 | (d) |
| 42 | (a) |
| 43 | (b) |
| 44 | ( c) |
| 45 | (d ) |
| 46 | c |
| 47 | a |
| 48 | b |
| 49 | c |
| 50 | a |
| 51 | b |
| 52 | c |
| 53 | b |
| 54 | c |
| 55 | c |
| 56 | b |
| 57 | a |
| 58 | b |
| 59 | a |
| 60 | a |
| 61 | c |
| 62 | d |
| 63 | d |
| 64 | c |
| 65 | b |
| 66 | b |
| 67 | d |
| 68 | c |

| | |
|---|---|
| 69 | b |
| 70 | c |
| 71 | b |
| 72 | b |
| 73 | b |
| 74 | a |
| 75 | d |
| 76 | Option (b) 5, 5 |
| 77 | Option (c) f(x) is continuous on $R^+$ |
| 78 | Option (a) $\frac{1}{t}$ |
| 79 | Option (b) k = - 1 |
| 80 | Option (c) - $e^{y-x}$ |
| 81 | Option (d) - $e^x \tan e^x$ |
| 82 | Option (a) 2 |
| 83 | Option (a) x $\in R$ |
| 84 | Option (b) $\frac{-4x}{1-x^2}$ |
| 85 | Option (c) n = $\frac{m\pi}{2}$ |
| 86 | Option (a) 2 |
| 87 | Option ( c) $\frac{x\cos x+\sin x}{2\sqrt{x\sin x}}$ |
| 88 | Option ( a) 0 |
| 89 | Option ( b) $\frac{1}{v}$ |
| 90 | Option ( c) f(x) is continuous at x = 0 |
| 91 | (A) $3x^2e^{x^3}$ |
| 92 | (C) $2xe^x + x^2e^x$ |
| 93 | (D) $a^x \log a$ |
| 94 | (D) $\frac{1}{x}log_e a$ |
| 95 | (C) $-\tan t$ |
| 96 | (A) $\frac{1}{x}$ |
| 97 | (D) $(x+1)e^x$ |
| 98 | (A) $2x$ |
| 99 | (D) $\frac{2x+1}{x^2+x}$ |
| 100 | (C) $10^{10^x}10^x(\log 10)^2$ |
| 101 | (D) $-1$ |
| 102 | (A) $6x + 2\sec^2 x \tan x$ |
| 103 | (A) $\frac{e^{\sqrt{x}}}{4\sqrt{xe^{\sqrt{x}}}}$ |

| | |
|---|---|
| 104 | (A) $\frac{e^{\sin^{-1}x}}{\sqrt{1-x^2}}$ |
| 105 | (A) $\frac{\cos(\log x)}{x}$ |
| 106 | a |
| 107 | c |
| 108 | d |
| 109 | d |
| 110 | a |
| 111 | b |
| 112 | a |
| 113 | c |
| 114 | d |
| 115 | d |
| 116 | c |
| 117 | b |
| 118 | b |
| 119 | b |
| 120 | C |
| 121 | A |
| 122 | D |
| 123 | D |
| 124 | B |
| 125 | D |
| 126 | A |
| 127 | B |
| 128 | C |
| 129 | A |
| 130 | A |
| 131 | C |
| 132 | B |
| 133 | A |
| 134 | D |
| 135 | A |
| 136 | B |
| 137 | B |
| 138 | D |
| 139 | B |
| 140 | C |
| 141 | D |
| 142 | A |
| 143 | C |

| | |
|---|---|
| 144 | B |
| 145 | D |
| 146 | A |
| 147 | A |
| 148 | B |
| 149 | D |
| 150 | C |
| 151 | A |
| 152 | C |
| 153 | C |
| 154 | D |
| 155 | D |
| 156 | A |
| 157 | B |
| 158 | D |
| 159 | C |
| 160 | B |
| 161 | D |
| 162 | A |
| 163 | B |
| 164 | D |
| 165 | b |

**Prepared by :** PGT(Maths) of BHUBANESWAR REGION, GUWAHATI REGION, KOLKATA REGION, SILCHAR REGION, RANCHI REGION & TINSUKIA REGION

**Vetted by :** KOLKATA REGION