chapter → Successive Differentiation

*** Multiple Choice Questions :-

Q→1 If $\sqrt{x}+\sqrt{y}=5$, then y_2 will be;

a) $\sqrt{a}/2x^{3/2}$ b) $25/2x^{3/2}$
c) $5/2x^{3/2}$ d) $1/10$

Q→2 If $y=x^x$, then y_2 will be;

a) $\left(\frac{1}{y}\right)y_1^2-\frac{y}{x}$ b) $\left(\frac{1}{y}\right)y_1^2-\frac{x}{y}$
c) $\left(\frac{x}{y}\right)y_1^2+\frac{y}{x}$ d) $\left(\frac{1}{y}\right)y_1^2+\frac{y}{x}$

Q→3 If $y=(2\tan^{-1}x)^2$, then;

(a) $(x^2+1)^2.y_2+2x(x^2+1)y_1+8=0$ b) $(x^2+1)^2.y_2+2x(x^2+1)y_1=8$
(c) $(x^2-1)^2.y_2+2x(x^2-1)y_1=2$ a) $(x^2+1)^2.y_1+2x(x^2+1)y_2+2=0$

Q→4 If $y=\sin(ax+b)$, then;

(a) $y_n=a^n\cos\{ax+b+n\pi/2\}$
(b) $y_n=b^n\sin\{ax+b+n\pi/2\}$
(c) $y_n=a^n.\sin\{ax+b+n\pi/2\}$
(d) $y_n=5\sin(ax+b+n\pi/2\}$

Q→5 If $y=e^x.\sin(ax+b)$, then;

(a) $y_{20}=(1+a^2)^{10}.e^x.\sin(ax+b+20\tan^{-1}a)$
(b) $y_{20}=(1+a^2)^{10}.\sin(ax+b+20\tan^{-1}a)$
(c) $y_{20}=(1+a)^{20}.\cos(ax+b+20\tan^{-1}a)$
(d) $y_{20}=(1+a^2)^{10}.e^x.\sin(ax+b+\tan^{-1}a)$

Q→6 If $y = \frac{x}{(x^2-1)}$, then y_{99} will be;

(a) $-99!$ (b) $99!$

(c) 99 (d) 0

Q→7 If $y = \sin(\log x)$ & $x^2y_2 + xy_1 + y = 0$, then;

(a) $x^2 y_{(n+2)} + (2n+1)\cdot x \cdot y_{(n+1)} + (n^2+1)y_n = 0$

(b) $x^2 y_{(n+2)} + (2n+1)\cdot y_{(n+1)} + (n^2+1)y_n = 0$

(c) $x^2 y_{(n+2)} + (2n+1)\cdot x \cdot y_{(n+1)} + (n^2-1)y_n = 0$

(d) $x^2 \cdot y_{n+2} + (2n-1)\cdot x \cdot y_{(n+1)} + (n^2+1)y_n = 0$

Q→8 If $y = e^{m \cdot \sin^{-1} x}$ and $(1-x^2)y_{(n+2)} - (2n+1)x \cdot y_{(n+1)} - (m^2+n^2)\cdot y_n = 0$ then $\lim_{x\to 0} \frac{y_{n+2}}{y_n} =$;

(a) n^2-m^2 b) m^2-n^2

(c) $n+m$ d) m^2+n^2

Q→9 If $y = x^3 \cdot \cos x$, then $y_n =$;

(a) $x^3 \cdot \cos\left\{x + \frac{n\pi}{2}\right\} + nx^2 \cdot \cos\left\{x + \frac{(n-1)\pi}{2}\right\}$

(b) $x^3 \cdot \cos\left\{x + \frac{n\pi}{2}\right\} + 3nx^3 \cdot \cos\left\{x + \frac{(n-1)\pi}{2}\right\}$

(c) $x^3 \cdot \cos\left\{x + \frac{n\pi}{2}\right\} + 3x^2 \cdot \cos\left\{x + \frac{(n-1)\pi}{2}\right\}$

(d) $x^3 \cdot \cos\left\{x + \frac{n\pi}{2}\right\} + 3nx^2 \cdot \cos\left\{x + \frac{(n-1)\pi}{2}\right\}$

Q→10 If $y = x^n \cdot \log x$, then $y_n =$;

(a) $n \cdot y_{(n-1)} + (n+1)!$ (b) $n \cdot y_{(n-1)} + (n-1)!$

(c) $n \cdot y_{(n-1)} + n!$ (d) $y_{(n-1)} + (n-1)!$

Q→11 If $x = \cos^3\theta$, $y = \sin^3\theta$, then y_2 at $\pi/4$ is ;

a) $5\sqrt{2}/3$ b) $4\sqrt{2}/3$

c) $3\sqrt{2}/5$ d) $4\sqrt{2}$

Q→12 If $y = (ax+b)^m$, then find y_n ; $\{m=-1\}$

a) 0 b) $n!.a^n$

c) $\frac{m!}{(m-n)!}.a^n.(ax+b)^{m-n}$ d) $\frac{(-1)^n.n!.a^n}{(ax+b)^{n+1}}$

Q→13 If $y = \sin 6x.\cos 4x$, then find y_n ;

a) $\frac{1}{2}\left[10^n.\sin\left(10x+\frac{n\pi}{2}\right)+2^n.\cos\left(2x+\frac{n\pi}{2}\right)\right]$

b) $\frac{1}{2}\left[10^n.\cos\left(10x+\frac{n\pi}{2}\right)+2^n.\cos\left(2x+\frac{n\pi}{2}\right)\right]$

c) $\frac{1}{2}\left[10^n.\sin\left(10x+\frac{n\pi}{2}\right)+2^n.\sin\left(2x+\frac{n\pi}{2}\right)\right]$

d) $\frac{1}{2}\left[10^n.\cos\left(10x+\frac{n\pi}{2}\right)+2^n.\sin\left(2x+\frac{n\pi}{2}\right)\right]$

Q→14 If $y = e^x.\sin^2 x$, then find y_n ;

a) $\frac{1}{2}e^x\left[1-(5)^{n/2}\cos\left(2x+n\tan^{-1}(2)\right)\right]$

b) $\frac{1}{2}e^x\left[1-(\sqrt{5})^n\sin\left(2x+n\tan^{-1}(2)\right)\right]$

c) $\frac{1}{2}e^x\left[1+(\sqrt{5})^n\cos\left(2x-n\tan^{-1}(2)\right)\right]$

d) $\frac{1}{2}e^x\left[1+(5)^{n/2}\sin\left(2x-n\tan^{-1}(2)\right)\right]$

15) If $y_n = x^2 \cdot e^{ax}$, find $y_n = ;$

a) $a^{n-2} \cdot e^{ax} [a^2x^2 + 2nax + n(n+1)]$

b) $a^{n+2} \cdot e^{ax} [a^2x^2 + 2nax + n(n+1)]$

c) $a^{n-2} \cdot e^{ax} [a^2x^2 + 2nax + n(n-1)]$

d) $a^{n-2} \cdot e^{ax} [ax + 2nax + n(n-1)]$

** Answers : { Successive Differentiation }

1) - (c)
2) - (d)
3) - (b)
4) - (c)
5) - (a)
6) - (a)
7) - (a)
8) - (d)
9) - (d)
10) - (b)
11) - (b)
12) - (d)
13) - (a)
14) - (a)
15) - (c)