Excel Coaching Classes

Date: 05-Jul-2026 | **Differentiation** | **Marks: 20**
Time: 60min

SECTION A

Q.1 **Select and write the correct answer for the following multiple choice type of questions:** **(4)**

i If $y = (5x^3 - 4x^2 - 8x)^9$,then $\frac{dy}{dx} =$

(A) $9(5x^3 - 4x^2 - 8x)^8 (15x^2 - 8x - 8)$

(B) $9(5x^3 - 4x^2 - 8x)^9 (15x^2 - 8x - 8)$

(C) $9(5x^3 - 4x^2 - 8x)^8 (5x^2 - 8x - 8)$

(D) $9(5x^3 - 4x^2 - 8x)^9 (5x^2 - 8x - 8)$

ii Differentiate $(\sin x)^x$ w. r. t. x.

(A) $[x \cot x + \log (\sin x)]$

(B) $(\sin x)^x [x \cot x + \log (\sin x)]$

(C) $(\sin x)^x [x \tan x + \log (\cos x)]$

(D) $[x \tan x + \log (\cos x)]$

Q.2 **Answer the following questions:** **(2)**

i Differentiate the following w.r.t. x.

$y = \sqrt{x^2 + 5}$

ii Differentiate the following w.r.t. x.

$\sin^{-1} (x^3)$

SECTION B

Attempt any TWO of the following questions: **(4)**

Q.3 Differentiate $\cos^{-1}\left(\frac{1-x^2}{1+x^2}\right)$ w. r. t. x.

Q.4 Find the second order derivative of the following:

$x^3 + 7x^2 - 2x - 9$

Q.5 Find $\frac{dy}{dx}$, if $e^{x+y} = \cos (x - y)$

SECTION C

Attempt any TWO of the following questions: **(6)**

Q.6 If $\sec^{-1}\left(\frac{x^3+y^3}{x^3-y^3}\right) = 2a$, then show that $\frac{dy}{dx} = \frac{x^2\tan^2 a}{y^2}$, where a is a constant.

Q.7 Find $\frac{d^2y}{dx^2}$, if $x = sin\sqrt{t},\ y = e^{\sqrt{t}}$

Q.8 If y = A cos (log x) + B sin (log x), show that $x^2 y_2 + xy_1 + y = 0$.

SECTION D

Attempt any ONE of the following questions: **(4)**

Q.9 If y = cos (mcos^{-1} x) then show that $\left(1-x^2\right)\frac{d^2y}{dx^2} - x\frac{dy}{dx} + m^2y = 0$.

Q.10 Find the nth derivative of cos (3 − 2x)