SHIKSHA CLASSES

BOARD QUESTION PAPER

Subject : Maths- II **Topic: 1. Differentiation** **Total Marks : 20**
Class : XII **Time : 1 Hr.**

Section A

Q.1 : Choose the correct option : 4

i) If $y = e^x + \log x$ then $\frac{dy}{dx}$ at $x = 1$ is

a) 0 b) 1 c) $2 - e$ d) $1 + e$

ii) $\frac{d}{dx}\tan^{-1}\left(\frac{5x+1}{3-x-6x^2}\right) =$

a) 0 b) 1

c) $\frac{1}{1+(3x+2)^2}+\frac{1}{1+(2x-1)^2}$ d) $\frac{3}{1+(3x+2)^2}+\frac{2}{1+(2x-1)^2}$

Q.2 : Solve the following questions: **2**

i) Differentiate the following w.r.t x $y=e^{\tan x}$

ii) Differentiate the following w.r.t x $y=\sin(\log x)$

Section B

Solve the following : (ANY2) 4

Q.3 : Find $\frac{dy}{dx}$ if $y = x^x$

Q.4 : If $y = e^{m\cos^{-1}x}$ then show that $(1-x^2)\frac{d^2y}{dx^2} - x\frac{dy}{dx} - m^2y = 0$

Q.5 : Find $\frac{dy}{dx}$, if $x = at^2$ and $y = 2at$

Section C

: **Answer the following : (ANY 2)** 6

Q.6 : Find $\frac{dy}{dx}$, if $y = \sin^{-1}\left(\frac{2x}{1+x^2}\right)$

Q.7 : If $x = e^{\sin 3t}$, $y = e^{\cos 3t}$ show that $\frac{dy}{dx} = -\frac{y \log x}{x \log y}$

Q.8 : $y = \log\left[\frac{x+\sqrt{x^2+25}}{\sqrt{x^2+25}-x}\right]$ find $\frac{dy}{dx}$

Section D

: **Answer the following : (ANY 1)** 4

Q.9 : If y is a differentiable function of u and u is a differentiable function of x, then prove that

$$\frac{dy}{dx} = \frac{dy}{du} \cdot \frac{du}{dx}$$

Q.10: If $x^p y^q = (x+y)^{p+q}$ show that $\frac{d^2y}{dx^2} = 0$

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