

TIME:1HR.

CHAPTER TEST

M.MARKS:30

CLASS: XII

Diffentiation

1. Diffentiate $\tan^{-1} \left(\frac{\cos x}{1 + \sin x} \right)$ with respect to x 3
2. If $y = 1 + \frac{x}{1} + \frac{x^2}{2} + \frac{x^3}{3} + \dots + \frac{x^n}{n}$, prove that $\frac{dy}{dx} - y + \frac{x^n}{n} = 0$ 3
3. Find the derivative of $\cos^2 x$ ab-initio. 3
4. If $y = ae^{mx} + be^{-mx}$, prove that $\frac{d^2y}{dx^2} - m^2y = 0$ 3
5. If f is differentiable at $x = a$, find $\lim_{x \rightarrow a} \frac{x^2f(a) - a^2f(x)}{x - a}$ 4
6. Find the derivative of $\tan^{-1} \left[\frac{\sqrt{1+x^2} + \sqrt{1-x^2}}{\sqrt{1+x^2} - \sqrt{1-x^2}} \right]$ 4
7. If $y = (\sin x)^{(\sin x)^{(\sin x)^{\dots \infty}}}$, prove that $\frac{dy}{dx} = \frac{y^2 \cot x}{1 - y \log(\sin x)}$ 4
8. Find $\frac{dy}{dx}$, if $x^y + y^x = a^b$ Where a,b are constants. 6