

TIME:1HR.

CHAPTER TEST

M.MARKS:30

CLASS: XII

Applications of Derivatives

1. Find the approximate value of $\tan^{-1}(0.999)$ using differentials. 3
2. Find the point on the curve $y = 3x^2 - 12x + 6$ at which the tangent is parallel to the x-axis
Also find the equation of the tangent at that point. 3
3. Find the value of a if $f(x) = x^4 - 62x^2 + ax + 9$ attains the maximum value at $x = 1$ in the interval $[0, 2]$. 3
4. A particle moves along the curve $6y = x^3 + 2$. Find the points on the curve at which the y-co-ordinate is changing 8 times as fast as x-co-ordinate. 3
5. Show that the function f given by $f(x) = \tan^{-1}(\sin x + \cos x)$, $x > 0$, is always an increasing function in $\left(0, \frac{\pi}{4}\right)$ 4
6. A jet of an enemy is flying along the curve $y = x^2 + 2$. A soldier is placed at the point (3,2). What is the nearest distance between the soldier and the jet. 4
7. Discuss the applicability of Rolle's Theorem of $f(x) = (x^2 - 1)(x - 1)$ on $[1, 2]$ 4
8. Prove that the volume of the largest cone that can be inscribed in a sphere of radius R is $\frac{8}{27}$ of the volume of the sphere. 6