APPLICATIONS OF DERIVATIVES

INTRODUCTION, RATE OF CHANGE OF QUANTITIES

EXERCISE

Q.1 Radius of a circle is increasing at rate of 3 cm/sec. Find the rate at which the area of circle is increasing at the instant when radius is 10 cm.

Q.2 A ladder of length 5 m is leaning against a wall. The bottom of ladder is being pulled along the ground away from wall at rate of 2cm/sec. How fast is the top part of ladder sliding on the wall when foot of ladder is 4 m away from wall.

Q.3 Water is dripping out of a conical funnel of semi-vertical angle 45° at rate of $2\text{cm}^3/\text{s}$. Find the rate at which slant height of water is decreasing when the height of water is $\sqrt{2}$ cm.

Q.4 A hot air balloon rising straight up from a level field is tracked by a range finder 500 ft from the lift-off point. At the moment the range finder's elevation angle is $\pi/4$, the angle is increasing at the rate of 0.14 rad/min. How fast is the balloon rising at that moment.

Q.5 A ladder 20 *ft.* long has one end on the ground and the other end in contact with a vertical wall. The lower end slips along the ground. Show that when the lower end of the ladder is 16 *ft.* away from the wall, upper end is moving 4/3 times as fast as the lower end.

Q.6 The distance covered by a motor car in t seconds after the brakes are applied is s feet, where $s = 22t - 12t^2$. Find the distance covered by the motor car before it stops.

ANSWER KEY

1. 60π cm^2/sec

2. $\frac{8}{3}$ cm/sec

3. $\frac{1}{\sqrt{2}\pi}$ cm/sec.

4. 140 ft/min.

6. 10.08 ft.