

Answer on Question #44622, Physics, Mechanics | Kinematics | Dynamics

An automobile travelling with a speed of 60km/hr, can brake to stop within a distance of 20 m. if the car is going twice as fast ,i.e. 120 km/hr, the stopping distance will be?

Solution:

Kinematics equation

$$2ad = v^2 - v_0^2$$

where a is acceleration, d is distance, v_0 is initial velocity and v is final velocity.

The acceleration is the same in both cases.

Thus,

$$a = \frac{-v_0^2}{2d}$$

So,

$$\frac{v_{01}^2}{2d_1} = \frac{v_{02}^2}{2d_2}$$

$$d_2 = \left(\frac{v_{02}}{v_{01}}\right)^2 d_1 = \left(\frac{120}{60}\right)^2 20 = 4 \cdot 20 = 80 \text{ m}$$

Answer: $d_2 = 80 \text{ m.}$