Question#19135

A car weighing 1000kg and travelling at 30m/s stops at a distance of 50m decelerating uniformly. What is the force exerted by the brakes and what is the work done by the brakes?

Solution:

Let:

$m = 1000\ kg$

$v = 30\ m/s$

$S = 50\ m$

$F - ?$

According to the second Newton's law:

$\boldsymbol{F = ma}$, were a – acceleration

$v = at, t = \frac{v}{a}, S = \frac{1}{2}at^2$

$S = \frac{1}{2}\frac{v^2}{a}$

$$\boldsymbol{a = \frac{v^2}{2S}}$$

$$\boldsymbol{F = \frac{mv^2}{2S}}$$

$$\boldsymbol{F = \frac{1000 * 30^2}{2 * 50} = 9000\ N}$$

Answer: 9000 N.