**Answer on Question 60827, Physics, Mechanics | Relativity**

**Question:**

A block of mass, 10 $kg$, collides with a spring that has a spring constant of 200 $N/m$ at a speed of 12 $m/s$ compressing the spring. When the block stops moving, how far is the spring compressed?

**Solution:**

According to the Law of Conservation of Energy, the kinetic energy of the block before it collides with the spring is converted into the potential energy of the spring after the spring is compressed:

$$KE_{block} = PE_{spring},$$

$$\frac{1}{2} m_{block} v_{block}^2 = \frac{1}{2} k(\Delta x)^2,$$

here, $m_{block}$ is the mass of the block, $v_{block}$ is the speed of the block, $k$ is the spring constant, $\Delta x$ is the distance by which the spring is compressed.

Then, from the last formula we can find $\Delta x$:

$$\Delta x = \sqrt{\frac{m_{block} v_{block}^2}{k}} = \sqrt{\frac{10\ kg \cdot \left(12\ \frac{m}{s}\right)^2}{200\ \frac{N}{m}}} = 2.68\ m.$$

**Answer:**

$\Delta x = 2.68\ m.$