

Answer on Question 49855, Physics, Mechanics | Kinematics | Dynamics

Question:

A work of $2J$ is required to elongate a spring of mass $16g$ with a spring constant $k = 2\frac{N}{m}$. What is the elongation?

Solution:

From the definition of the work done by the spring we have:

$$W = \frac{1}{2}kx^2,$$

where W is the work required to elongate the spring, k is the spring constant and x is the elongation of the spring.

From this formula we can obtain the elongation of the spring:

$$x = \sqrt{\frac{2W}{k}} = \sqrt{\frac{2 \cdot 2J}{2\frac{N}{m}}} = 1.41m.$$

Answer:

The elongation of the spring is $x = 1.41m$.