

Answer on Question #41139, Physics, Mechanics | Kinematics | Dynamics

Question:

A wire suspended vertically from one end is stretched by attaching a weight of 20 N to the lower end. The weight stretches the wire by 1mm. How much energy is gained by the wire

Answer:

Energy of wire deformation equals:

$$E = \frac{kx^2}{2}$$

where k is force constant, x is deformation.

Force constant equals:

$$k = \frac{F}{x}$$

where F is force.

Therefore:

$$E = \frac{F}{2x} x^2 = \frac{Fx}{2} = \frac{20 \text{ N} \cdot 0.001 \text{ m}}{2} = 0.01 \text{ J}$$

Answer: 0.01 J