Young's modulus, *E*, can be calculated by as:

$$E = \frac{FL0}{A0\Delta L}$$

It is defined as the ratio of the uniaxial stress over the uniaxial strain in the range of stress in which Hooke's Law holds.

Where:

$E - is\ the\ Young's\ modulus\ (modulus\ of\ elasticity)$

$F - ie\ the\ force\ exeterned\ on\ an\ object$

$A0 - is\ the\ original\ cross - sectional\ area$

$\Delta L - is\ the\ amount\ by\ which\ the\ length\ of\ the\ object\ changes$

$L0 - is\ the\ original\ length\ of\ the\ object$

Let:

$F = 3000N$

$A0 = 6 * 10^{-5}m^2$

$\Delta L = 0.2mm = 2 * 10^{-4}m$

$L0 = 50cm = 0.5m$

$E = ?$

$E = \frac{FL0}{A0\Delta L} = \frac{3000*0.5}{6*10^{-5}*2*10^{-4}} = 125\ \text{GPa}\ (125 * 10^9\text{Pa} - \text{pascal or N/m}^2)$.

Answer:

$E = 125\ GPa$