Answer on Question #46430, Physics, Other

The tensile stress and tensile strain of a wire are 6.09 * 10^7 Nm^{-2} and 3 * 10^{-4} respectively. Determine young's modulus of the wire.

Solution:

Given:

$\sigma = 6.09 \cdot 10^7\ \mathrm{Nm}^{-2}$,

$\varepsilon = 3 \cdot 10^{-4}$,

$E = ?$

The Young Modulus is defined as the ratio of the tensile stress and the tensile strain.

So we can write:

$$Young\ modulus\ = \frac{tensile\ stress}{tensile\ strain}$$

$$E = \frac{\sigma}{\varepsilon}$$

Thus,

$$E = \frac{6.09 \cdot 10^7}{3 \cdot 10^{-4}} = 2.03 \cdot 10^{11}\ \mathrm{Nm}^{-2}$$

Answer: $E = 2.03 \cdot 10^{11}\ \mathrm{Nm}^{-2}$.