Answer on Question #76212, Physics / Mechanics | Relativity

In a solid, the speed of elastic longitudinal wave is $c = 1.35$ m/s. If the young's modulus of elasticity of the solid is $E = 2 \times 10^{11}$ N/m^2. Calculate its mass density.

Solution:

The speed of elastic longitudinal wave

$$c = \sqrt{\frac{E}{\rho}}$$

Therefore

$$\rho = \frac{E}{c^2} = \frac{2 \times 10^{11}}{1.35^2} = 11 \times 10^{10} \text{ kg/m}^3$$

Answer: 11×10^{10} kg/m^3