Answer on Question #64487, Physics / Mechanics | Relativity

The block of material shown below has a shear modulus of 65 GPa. Determine the shear stress and the shear strain induced by the 6 kN shearing force.

Solution:

Let the the block has the following dimensions 150mm x 50mm x 75mm.

$$\tau = \frac{F}{A} = \frac{6 \text{ kN}}{50\text{mm} \times 75\text{mm}} = 1.60 MPa$$

$$Y = \frac{\tau}{G} = \frac{1.60 MPa}{65 \text{ GPa}} = 2.46 \cdot 10^{-5}$$

Answer: $1.60 MPa$ and $2.46 \cdot 10^{-5}$