

Momentum Sheet # 9 + extra

A 16.0 g bullet travelling at 80.0 m/s hits a 485 g block of wood and stops in 0.020 s. What is the common velocity after collision, impulse on the block, and force on the block?

$P = P'$
 $m_b v_b + m_T v_w = (m_b + m_T) v'$
 $(0.016)(80.0) + 0 = (0.016 + 0.485) v'$
 $1.28 \text{ kg}\cdot\text{m/s} = 0.501 \text{ kg} v'$
 $2.56 \text{ m/s} = v'$

$\vec{J}_{\text{on block}} = m_T (v_f - v_i) = (0.485)(0 - (-2.56))$
 $= -1.28 \text{ kg}\cdot\text{m/s}$

$\vec{J} = F \Delta t$
 $-1.28 \text{ kg}\cdot\text{m/s} = F(0.02 \text{ s})$
 $64 \text{ kg}\cdot\text{m/s} = F$
 $64 \text{ N} = F$

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