

Answer on Question #64004, Physics / Mechanics | Relativity

Question:

A 1 kg object is moving with a velocity of 6 m/s to the right. It collides and sticks to a 2 kg object moving with a velocity of 3 m/s in the same direction. How much kinetic energy is lost in the collision?

Solution:

According to the law of conservation of energy we may write that

$$E_k^1 + E_k^2 = E_k^{12} + \Delta E$$

$$E_k^1 = \frac{m_1 v_1^2}{2}, \quad E_k^2 = \frac{m_2 v_2^2}{2}, \quad E_k^{12} = \frac{(m_1 + m_2) v_2^2}{2}$$

$$\Delta E = E_k^1 + E_k^2 - E_k^{12} = \frac{m_1 v_1^2 + m_2 v_2^2 - (m_1 + m_2) v_2^2}{2}$$

$$\Delta E = \frac{1 \cdot 6^2 + 2 \cdot 3^2 - (1 + 2) \cdot 3^2}{2} = 13.5 \text{ J}$$

Answer:

13.5 J

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