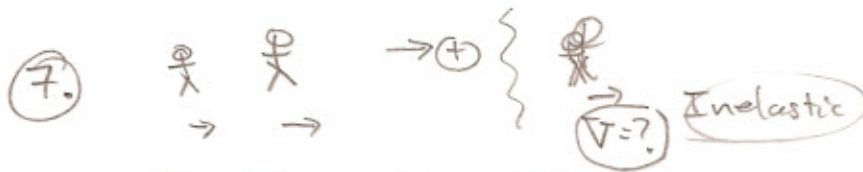


(2)



$$m_s = 60 \text{ kg}$$

$$v_{os} = +5 \frac{\text{m}}{\text{s}}$$

$$m_b = 75 \text{ kg}$$

$$v_{ob} = +2 \frac{\text{m}}{\text{s}}$$

$$m_1 \vec{v}_1 + m_2 \vec{v}_2 = (m_1 + m_2) \vec{V}$$

$$\vec{V} = \frac{(60 \text{ kg})(5 \frac{\text{m}}{\text{s}}) + (75 \text{ kg})(2 \frac{\text{m}}{\text{s}})}{135 \text{ kg}}$$

$$\vec{V} = 3.3 \frac{\text{m}}{\text{s}}$$

(8.)

$$m_1 \rightarrow$$

$$m_2 \rightarrow$$

$$v_{1o}$$

$$v_{2o}$$

$$\leftarrow m_1$$

$$m_2 \rightarrow$$

$$v_{1f}$$

$$v_{2f}$$

$$m_1 = 0.22 \text{ kg}$$

$$v_{1o} = +7.5 \frac{\text{m}}{\text{s}}$$

$$m_2 = 5.0 \text{ kg}$$

$$v_{2o} = 0$$

Elastic

$$v_{1f} = ?$$

$$v_{2f} = ?$$

$$(0.22 \text{ kg})(7.5 \frac{\text{m}}{\text{s}}) + 0 = (0.22 \text{ kg})v_{1f} + (5.0)v_{2f}$$

and

$$\frac{1}{2} m_1 v_{1o}^2 + \frac{1}{2} m_2 v_{2o}^2 = \frac{1}{2} m_1 v_{1f}^2 + \frac{1}{2} m_2 v_{2f}^2$$

$$(0.22 \text{ kg})(7.5 \frac{\text{m}}{\text{s}})^2 + 0 = (0.22 \text{ kg})v_{1f}^2 + (5.0 \text{ kg})v_{2f}^2$$

2 equations, 2 unknowns \Rightarrow solve ... OR

check: intuition: $v_{2f} \ll v_{1f}$; $v_{1f} < 0$; $v_{2f} > 0$; $v_{2f} \neq 0$

so (2), (3), (4) not physical

$$v_{1f} = -6.9 \frac{\text{m}}{\text{s}} \quad \text{and} \quad v_{2f} = +0.63 \frac{\text{m}}{\text{s}}$$

solution to two equations.