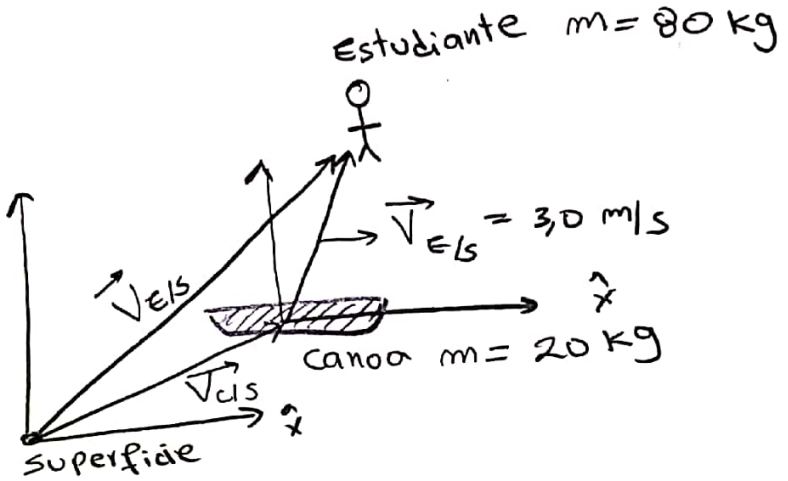
(11)



(a)

$$\vec{V}_{C/S} + \vec{V}_{E/C} = \vec{V}_{E/S}$$

$$\vec{P}_{inicial} = 0 = \vec{P}_{final}$$

$$0 = \vec{V}_{E/S} \cdot (80\,kg) + (\vec{V}_{E/S} - \vec{V}_{E/C})(20\,kg)$$

$\vec{V}_{E/C} = 3{,}0\ m/s$

$$\vec{V}_{E/S}(80+20) - 3{,}0\,\frac{m}{s}(20\,kg) = 0 \rightarrow \vec{V}_{E/S} = \frac{3{,}0\,\frac{m}{s}(20\,kg)}{100\,kg} = 0{,}6\,\frac{m}{s}\hat{x}$$

(b)

$$\vec{V}_{C/S} = \vec{V}_{E/S} - \vec{V}_{E/C} = 0{,}6\,\frac{m}{s} - 3{,}0\,\frac{m}{s} = -2{,}4\,\frac{m}{s}\hat{x}$$

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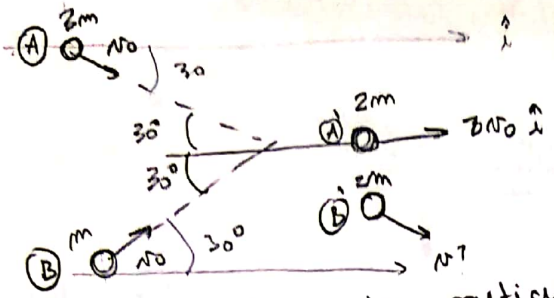

(a) velocidad final de la otra particula

Inicial { Particula (A) $\vec{v}_{0_A} = v_0\cos(30)\hat{i} - v_0\,\text{sen}(30)\hat{j}$

Particula (B) $\vec{v}_{0_B} = v_0\cos(30°)\hat{i} + v_0\,\text{sen}(30)j$

(A') $= \vec{v}_{f_{A'}} = 3v_0\,\hat{i}$

(B') $= \vec{v}_{f_{B'}} = v_x\,\hat{i} + v_y\,\hat{j}$ → a resolver

Conservacion del momento lineal

→ $P_{ix} = P_{fx}$ →

↓

x) $3m(v_0\cos(30)) + m\,v_0\cos(30) = 2m.(3v_0) + 2m(v_x)$

$4m\,v_0\cos(30) - 6m\,v_0 = 2m\,v_x \Rightarrow \boxed{v_x = 2v_0\cos(30) - 3v_0}$

$P_{iy} = P_{fy}$

y) $3m(-v_0\,\text{sen}(30)) + m(v_0\,\text{sen}(30)) = 2m.v_y$ (1/2)

$-2m\,v_0\,\text{sen}(30) = 2m\,v_y \rightarrow \boxed{v_y = -\frac{v_0}{2}}$

$\boxed{\vec{v}_{f_{B'}} = v_0(2\cos(30) - 3)\hat{i} - \frac{v_0}{2}\hat{j}}$ $\quad v_{f_{B'}}^2 = v_0^2\overbrace{(2\cos(30)-3)^2}^{1,6} + \frac{v_0^2}{4}$

(b)

Antes del choque K_i: $\frac{3m}{2}.v_0^2 + \frac{m}{2}v_0^2 = 2m\,v_0^2 = v_0^2(1,6 + \frac{1}{4})$

despues del choque:

K_f $\frac{2m}{2}v_0^2 + \frac{2m}{2}(v_0^2(1,6 + 0,25)) = (2.85)m\,v_0^2$

→ hacemos la diferencia $\Delta K = 0,85$

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→ Conservación del momento → choque M y m_1

$$MV = MV_f + m_1 v_{f1}$$

Velocidad relatividad

$$V = v_{f1} - V_f \rightarrow V_f = v_{f1} - V$$

$$MV = M(v_{f1} - V) + m_1 v_{f1}$$

$$v_{f1}(M + m_1) = 2MV \rightarrow \boxed{v_{f1} = \frac{2MV}{(M+m_1)}}$$

→ choque entre m_1 y m_2

Ahora v_{f1} es la inicial en el siguiente choque → $v_{f1} = v_{i1}$

choque completamente inelastico $v_{f2} = v_{f1}$

$$\rightarrow m_1 v_{i1} = v_{f2}(m_2 + m_1) \Rightarrow \boxed{v_{f2} = \frac{m_1 v_{i1}}{(m_2+m_1)} = \frac{2MVm_1}{(M+m_1)(m_2+m_1)}}$$