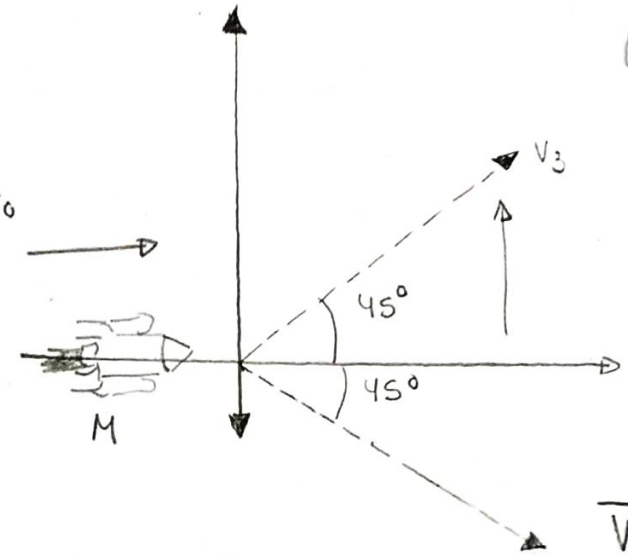
Asignatura: Fisica 1 Fecha: 25/06/21 Codigo: C9901-S

**Datos** **Problema 1**

$V_0 = 8000\ Km/h$ $\theta_1 = 45°$ $\theta_2 = 0°$ $\theta_3 = 45°$

$v_1 = 9000\ Km/h$ $V_2 = 1000\ Km/h$ $V_3 = 11000\ Km/h$




$$[m_1 + m_2 + m_3]\vec{V_0} = m_1\vec{V_1} + m_2\vec{V_2} + m_3\vec{V_3} \quad (1)$$

$$\vec{V_0} = |\vec{V_0}|\,(i) \Rightarrow \uparrow \begin{pmatrix} V_0 \\ \end{pmatrix} = \vec{V_0}$$

$$\vec{V_1} = (V_1)(\cos 45\, i + \operatorname{sen} 45\, j)$$

$$\Rightarrow \begin{pmatrix} V_1 \cos 45° \\ V_1 \operatorname{sen} 45 \end{pmatrix} = \vec{V_1}$$

$$\vec{V_2} = V_2\,(i) \Rightarrow \begin{pmatrix} V_2 \\ 0 \\ 0 \end{pmatrix} = \vec{V_2}$$

$$\vec{V_3} = |V_3|\,(\cos 45\, i - \operatorname{sen} 45\, j)$$

$$\Rightarrow \begin{pmatrix} V_3 \cos 45 \\ -V_3 \operatorname{sen} 45 \\ 0 \end{pmatrix} = \vec{V_3}$$

Remplazamos las velocidades

$w_3 = 1600\ J$

$$(1600 \times 8000 + m_2\,8000 + m_3 \times 8000)\,i = \sum m V_i\,(1)$$

$$(1{,}28 \times 10^7 + 8 \times 10^3 m_2 + 8 \times 10^3 m_3) = 1600 \times 900 \times \cos 45°\, i$$

$m_2 \wedge 10000 \mid + mg \times 1100 \cos 45°$

$$[0\,j = 1600 \times 9000 \times \operatorname{sen} 45°\, j + 0 - \uparrow + m_2 \times 11000 \times \operatorname{sen} 45\ (1)$$

$$m_2 = \frac{1600 \times 9000}{11\,000} \Rightarrow 1309{,}09$$

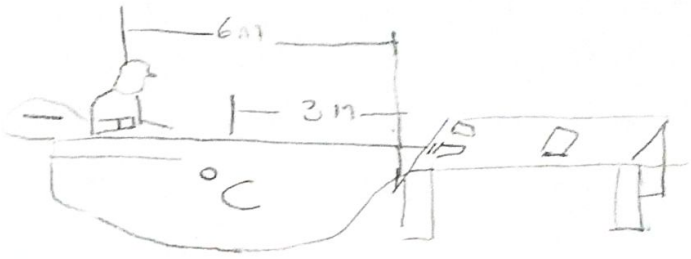
De los componentes puedo hallar $m_2$ ||

$$8 \times 10^3 m_2 - 10\,000\, m_2 = (1600 \times 9000 \cos 45) + m_3 \times 11000 \cos 45.$$

$$-8 \times 10^3 m_3 - 1{,}27 \times 10^7$$

$$m_2 = \left( \frac{989/948{,}025 - 1{,}28 \times 10^7}{8 \times 10^3 - 10000} \right) = \frac{-29080\,31{,}975}{-2000} = \boxed{1454{,}03\ kg}$$

2- Datos




$m_1 = 70\,kg$

$m_2 = 120\,kg$

$\vec{r}_{CM} = x_{CM} + y_{CM} + z_{CM}$

$\vec{r}_{CM} = \frac{1}{M}\sum_{i=1}^{n}$

$x_{CM} = \frac{m_1 x_1 + m_2 x_2}{m_1 + m_2}$

$x_{CM} = \frac{70\,(6) + 120\,(3)}{120+70}$

$x_{CM} = \frac{781}{19}$

$x'_{CM} = \frac{70\,0'_1 + 120\,(x')}{120+70}$

$x'_{CM} = \frac{70\,0'_1 + 120\,x'}{190}$

$x_{0CM} = x'_{CM}$

$\frac{78}{19} = \frac{70,0' + 120x'}{190}$

$\frac{78}{19} \times 190 = x' 120$

$x' = \frac{196 \times 4,105}{120}$

$x'_1 = 6,15\,[m]$ ∴

$x = x'_F - x_0$

$x = 6,15 - 6$

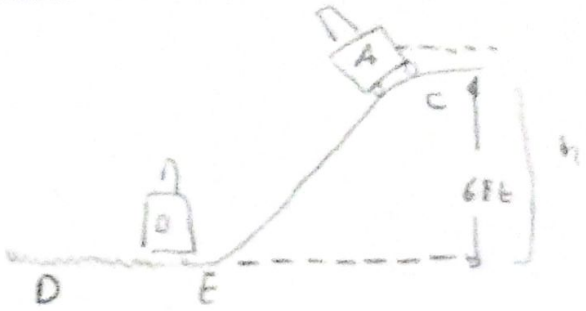
$\boxed{x = 0,15[m]}$

$\boxed{x_1 = 4,85\ pies}$

3 - Rpta

$e = 0,3$

$\mu_K = 0,4$




- Calculemos la velocidad A antes del choque

$$E_1 = E_2$$

$$m_A g h_A = \frac{1}{2} m_A V_2'$$

$$V_2 = \sqrt{2gh}$$

$$V_2 = \sqrt{2 * 32,2 (6 * 0,3048)}$$

$$\boxed{V_2 = 19,65 \left[\frac{Ft}{S}\right]}$$

choque

$$e = \frac{V_A' - V_B'}{V_A - V_B}$$

$$\boxed{e V_A = -V_A' + V_B'} \quad (1)$$

$$m_A V_A + m_B V_B = m_A V_A' + m_B V_B'$$

$$\boxed{W_A V_A = W_A V_A' + W_B V_B'} \quad (2)$$

De (2)

$$\rightarrow 15 * 19,65 = 15 V_A' + 10 V_B'$$

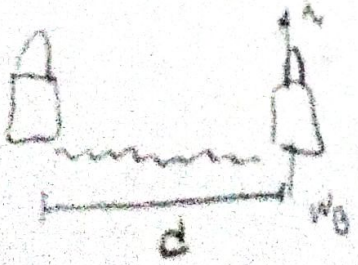
$$294,855 = 15 V_A' + 10 V_B'$$

$$3,595 = -V_A' + V_B'$$

$$\boxed{V_A' = 9,4362 \text{ (pies/s)}} \quad (A)$$

$$\boxed{V_B' = 15,332 \text{ pies/s}}$$

Calculando en B



$$E_{oB} = E_{FD} + W_{roz}$$

$$\frac{1}{2} m_B (V_B')^2 = B + (M+N)\, d$$

$$d = \frac{m_B (V_B')^2}{2\mu \cdot N}$$

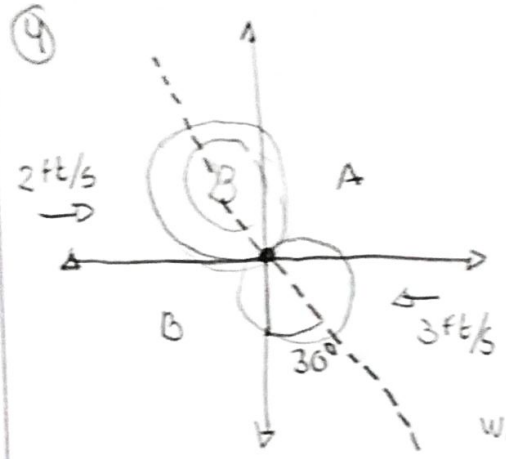
$$d = \frac{1\ m_B\ (V_B')^2\ g}{2\mu \times W_B \times g}$$

$$d = \frac{W_B (V_B')^2}{2\mu \cdot g\, W_B}$$

$$d = \frac{(V_B')^2}{2\mu g}$$

$$d = \frac{(15,3312)^2}{2 * 0,4 \times 32,2} = \boxed{9,124 \text{ pies}}$$

④




Datos

$W_A = 13,2 \times 10^{-3}$ lb

$W_B = 6,66 \times 10^{-3}$ lb

$C = 0,65$

Conservación momentun lineal aplicamos [m/m]×s

$\sum m_A \vec{V_A} + \sum m_B \vec{V_B} = \sum m_A V_A' + \sum m_B V_B'$

$W_A \times \vec{V_A} + W_B \vec{V_B} = W_A \vec{V_A'} + W_B \vec{V_B'} \Rightarrow 6,6 \times 10^{-3} \; W_A \vec{V_A} + W_B \vec{V_B}$

$$e = -\frac{|\vec{V_A'}| - |\vec{V_B'}|}{|\vec{V_A}| - |\vec{V_B}|} = 0,65 = -\frac{|\vec{V_A'}| - |\vec{V_B'}|}{2 - 3}$$

DC ① $0,65 = |V_A'| - |V_B'|$

$$|V_B'| = |V_A'| + 0,65 \quad ②$$

$\vec{V_A'} = |V_A'| \cdot (-\text{sen } 30\, i + \cos 30\, j)$

$\vec{V_B} = \underbrace{|V_B'|}_{0,65 + |V_A'|} \cdot (\text{sen } 30\, i + \cos 30\, j)$

$(6,6 \times 10^{-3})(ti) = W_A \times |V_A'| (-\text{sen } 30\, i + \cos 30\, j) + W_B \times 0,65$

$(\text{sen } 30\, i - \cos 30) + W_B \cdot |V_A'| (\text{sen } 30 i - \cos 30)$

Igualando

i $\Rightarrow 6,6 \times 10^{-3} = W_A |V_A'| (-\text{sen } 30) + W_B \; 0,65 \; \text{sen } 30 + W_A |V_A'| \times \text{sen } 30$

$$|V_A'| = \frac{6,6 \times 10^{-3} - W_A \times 0,65 \times \text{sen } 30}{W_B \; \text{sen } 30 - W_A \; \text{sen } 30}$$

$|V_A'| = 27/20 = 1,35$ [pies ft/s]

$|V_B'| = 1,35 + 0,65 = 2$ [pies/s]