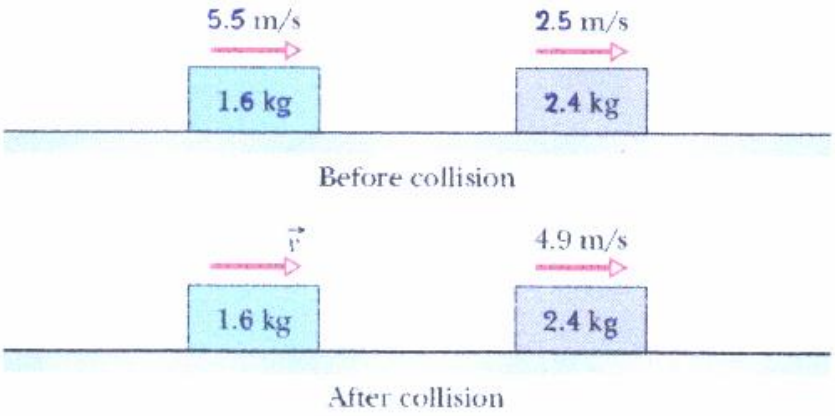
Phys. 101 – Sec # 1 **(Ch. 9 & 10)**

Name: Key ID # SN#

Two blocks slide without friction.



a) What is the **velocity** $\vec{v}$ of the 1.6 kg block after collision?

$\vec{P}_i = \vec{P}_f$

$\Rightarrow (1.6)(5.5)\hat{i} + (2.4)(2.5)\hat{i} = 1.6\,\vec{v}_f + (4.9)(2.4)\hat{i}$

$\vec{v}_f = \dfrac{8.8\hat{i} + 6\hat{i} - 11.76\hat{i}}{1.6} = (1.9\ m/s)\,\hat{i} = (1.9)\hat{i}\ m/s$

b) Is the collision elastic or in-elastic? Explain.

We compare K_i and K_f

$K_i = \frac{1}{2}(1.6)(5.5)^2 + \frac{1}{2}(2.4)(2.5)^2 = 24.2 + 7.5 = 31.7\ J$

$K_f = \frac{1}{2}(1.6)(1.9)^2 + \frac{1}{2}(2.4)(4.9)^2 = 2.9 + 28.8 = 31.7\ J$

since $K_i = K_f \Rightarrow$ it is an **elastic** collision

c) What is the speed of the center of mass **before** and **after** collision?

$(v_{com})_i = (v_{com})_f$ it is the same

$(v_{com})_i = \dfrac{(P_{tot})_i}{M_{tot}} = \dfrac{P_{1i} + P_{2i}}{m_1 + m_2} = \dfrac{8.8\hat{i} + 6\hat{i}}{1.6 + 2.4} = \dfrac{14.8}{4} = 3.7\ \hat{i}\ m/s$

$(v_{com})_f = \dfrac{P_{1f} + P_{2f}}{m_1 + m_2} = \dfrac{3 + 11.76}{4} = (3.7\ m/s)\,\hat{i}$