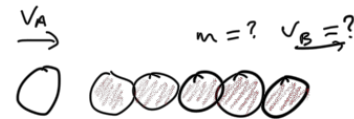


INITIAL



All balls  $m$

FINAL



$$u_A + v_A = \cancel{u_B} + v_B$$

$$v_B = v + v_A \quad (1)$$

Cons. momentum

$$mv = mv_A + m_B v_B \quad (2)$$

Cons. KE

$$\frac{1}{2}mv^2 = \frac{1}{2}\cancel{m}v_A^2 + \frac{1}{2}\cancel{m_B}v_B^2 \quad (3) \Rightarrow m(v^2 - v_A^2) = m_B v_B^2$$

$$(1) \text{ in } (2) \Rightarrow mv = mv_A + m_B(v + v_A) \Rightarrow m(v - v_A) = m_B(v + v_A)$$

$$\Rightarrow m_B = m \frac{v - v_A}{v + v_A}$$

$$m_B = m$$

If  $v_A > v \Rightarrow m_B$  negative = impossible.  
 If  $v_A < v \Rightarrow m_B < m$  = not available.  
 If  $v_A = v \Rightarrow m_B = 0$  = impossible.  
 $v_A = 0$  only solution.  $\Rightarrow m_B = m$

$$(2) \Rightarrow mv = \cancel{m}v_A + \overset{m}{m_B}v_B$$

$$\Rightarrow \underline{\underline{v_B = v}}$$