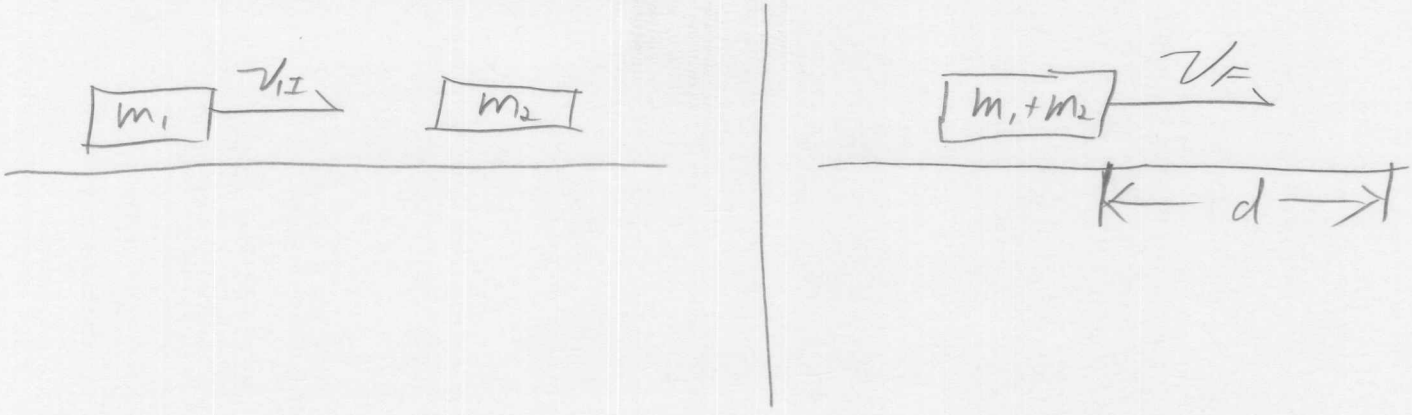
Physics 111
Homework

9-53

$m_1 = 1600\ kg$ $d = 25\ m$
$m_2 = 1300\ kg$ $\mu_k = 0.77$



① conserve momentum (Inelastic collision)

$$m_1 v_{1I} = (m_1 + m_2) v_F \Rightarrow \underline{v_F = \frac{m_1}{m_1 + m_2} v_{1I}}$$

② Work energy for skid

$$\tfrac{1}{2}(m_1 + m_2) v_F^2 - \mu_k (m_1 + m_2) g d = 0$$

put them together and solve for v_{1I}

$$\frac{1}{2} \frac{m_1}{m_1 + m_2} v_{1I} = \mu_k g d$$

$$\boxed{v_{1I} = \frac{2(m_1 + m_2)}{m_1} \mu_k g d}$$