Wkst 3 #3

③ $m_t = 0.73\,kg$

$m_d = 0.025\,kg$

$(m_{d+t} = 0.755\,kg)$

$h_F = 0.12\,m$

$v_{di} = ?$

$p_{di} = m_d \cdot v_{di} \Rightarrow v_{di} = \frac{p_{di}}{m_d}$

$p_{di} + p_{ti} = p_{d+t}$ ($p_{ti} = 0$)

$p_{d+t} = m_{d+t}\, v_{d+t}$

$KE_i = \frac{1}{2} m_{d+t} \cdot v_{d+t}^2 \Rightarrow v_{d+t} = \sqrt{\frac{2KE}{m_{d+t}}}$

$KE_i + PE_i = KE_F + PE_F$ ($KE_F = 0$)

$PE_F = m_{d+t} \cdot g \cdot h_F$

$$v_{di} = \frac{m_{d+t}(\sqrt{2gh_F})}{m_d} = \frac{.755\,kg \cdot \sqrt{2(9.8\,m/s^2)(.12\,m)}}{.025\,kg} = 46\,m/s$$

$v_{di} = 46\,m/s$

$p_{d+t} = 1.16\,kgm/s$

$v_{d+t} = 1.5\,m/s$

$KE_i = 0.887\,J$

$PE_F = 0.887\,J$