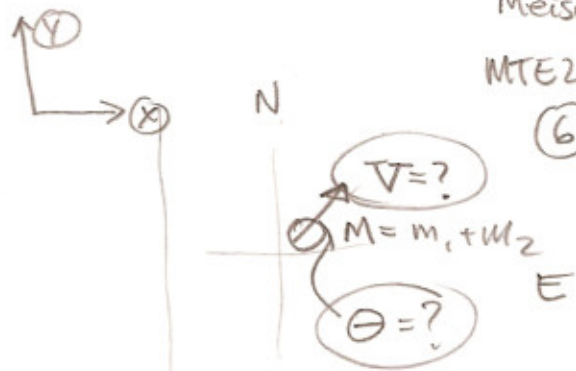


(19)  $m_2 = 10^3 \text{ kg}$   
 $v_2 = 37.5 \frac{\text{m}}{\text{s}}$

inelastic

$m_1 = 2500 \text{ kg}$   
 $v_1 = 15 \frac{\text{m}}{\text{s}}$



X:  $m_2 v_2 = M v_x \Rightarrow v_x = \frac{m_2}{M} v_2 = 10.7 \frac{\text{m}}{\text{s}}$

Y:  $m_1 v_1 = M v_y \Rightarrow v_y = \frac{m_1}{M} v_1 = 10.7 \frac{\text{m}}{\text{s}}$

$v = \sqrt{v_x^2 + v_y^2} = 15.15 \frac{\text{m}}{\text{s}}$

$\theta = \tan^{-1} \frac{10.71 \frac{\text{m}}{\text{s}}}{10.71 \frac{\text{m}}{\text{s}}} = 45^\circ \text{ N of E}$

(20)



$\tau = ?$

$d = 30 \text{ nm}$

$F = 10 \text{ pN}$

$\phi = 60^\circ$

$l = d \sin 60^\circ$

$\tau = Fl = (10 \times 10^{-12} \text{ N})(30 \times 10^{-9} \text{ m})(\sin 60^\circ)$

$\tau = 2.6 \times 10^{-19} \text{ Nm}$