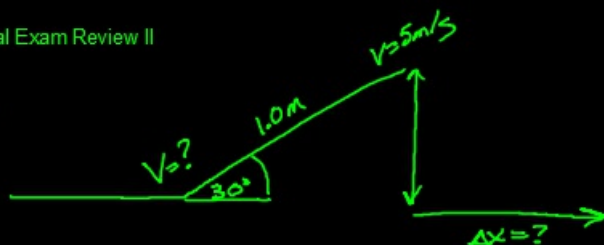


1.



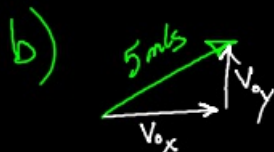
$$a) U_o + K_o + W_{nc} = U_f + K_f$$

$$0 + \frac{1}{2} m V_o^2 = m g y_f + \frac{1}{2} m V_f^2$$

$$0.5 V_o^2 = g y_f + 0.5 V_f^2$$

$$0.5 V_o^2 = (9.8)(0.5) + 0.5(5)^2$$

$$V_o = 5.9 \text{ m/s}$$



$$\underline{x}$$

$$V_o = 4.33 \text{ m/s}$$

$$a = 0$$

$$\Delta x = ?$$

$$\underline{y}$$

$$V_o = 2.5 \text{ m/s}$$

$$a = -9.8 \text{ m/s}^2$$

$$\Delta y = -0.5 \text{ m} \quad t = ?$$

$$V_f^2 = V_o^2 + 2a(\Delta y)$$

$$V_x^2 = (2.5)^2 + 2(-9.8)(-0.5)$$

$$V_{fy} = -4.01 \text{ m/s}$$

$$V_f = V_o + at$$

$$-4.01 = 2.5 + (-9.8)t$$

$$t = 0.664 \text{ s}$$

$$\Delta x = V_o t + \frac{1}{2} a t^2$$

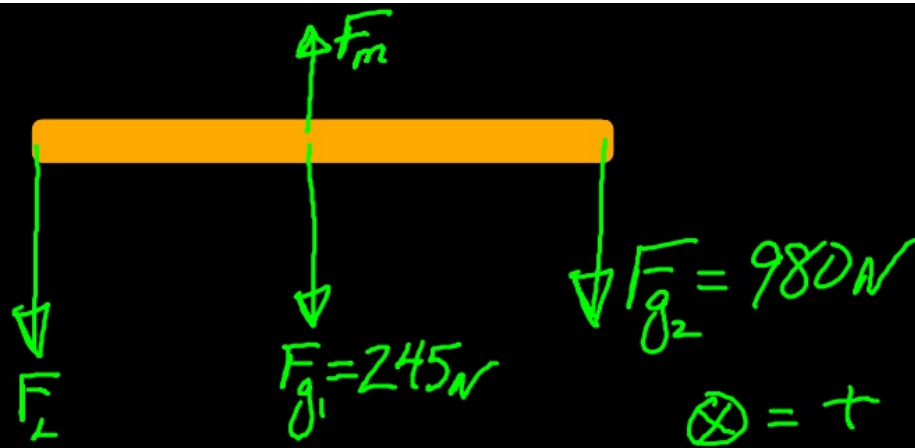
$$\Delta x = (4.33)(0.664) + 0 = 2.87 \text{ m}$$

$$c) a = ?$$

$$V_f^2 = V_o^2 + 2a(\Delta r)$$

$$a = \frac{V_f^2 - V_o^2}{2(\Delta r)} = \frac{5^2 - 5.9^2}{2(1)} = -4.9 \text{ m/s}^2$$

2.



a) $\tau = ?$ $\tau = \vec{r} \times \vec{F} = (1.5)(980\text{ N}) \sin 90^\circ$
 (not net torque) $= 1470\text{ Nm}$

b) $F_L = ?$ $F_m = ?$

$\Sigma \tau_m = 0$ $\tau_{\text{man}} - \tau_L = 0$

$\tau_L = 1470 = 1.5 F_L$

$F_L = 980\text{ N}$

$\Sigma F = 0$

$-F_L + F_m - F_{g1} - F_{g2} = 0$

$-980 + F_m - 245 - 980 = 0$ $F_m = 2205\text{ N}$