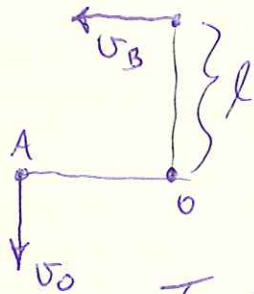


PROB. 13-39



a) IF AO IS A ROPE, THE SMALLEST v_0 WILL OCCUR IF THE TENSION IN THE ROPE IS ZERO.

$$T_0 + dl_B = T_B$$

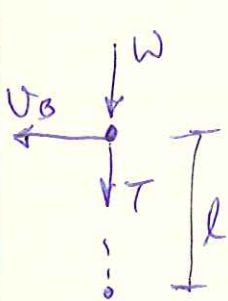
$$T_0 = \frac{1}{2} m v_0^2, T_B = \frac{1}{2} m v_B^2, U_B = F \cos \alpha \cdot dx$$



$$U_B = -W \cdot l = -mgl$$

$$\frac{1}{2} m v_0^2 - mgl = \frac{1}{2} m v_B^2 \Rightarrow v_0^2 = v_B^2 + 2gl$$

AT POINT B: ~~v_B~~



$$\sum F_n = m \frac{v_B^2}{l}$$

$$W + T = m \frac{v_B^2}{l}$$

$$mg = \frac{m v_B^2}{l}, v_B^2 = gl$$

$$v_0 = \sqrt{v_B^2 + 2gl} = \sqrt{gl + 2gl} = \sqrt{3gl}$$

b) IF AO IS A ROD, THE ROD WILL SUPPORT THE WEIGHT, SO $v_B = 0$:

$$v_0 = \sqrt{v_B^2 + 2gl} = \sqrt{2gl}$$