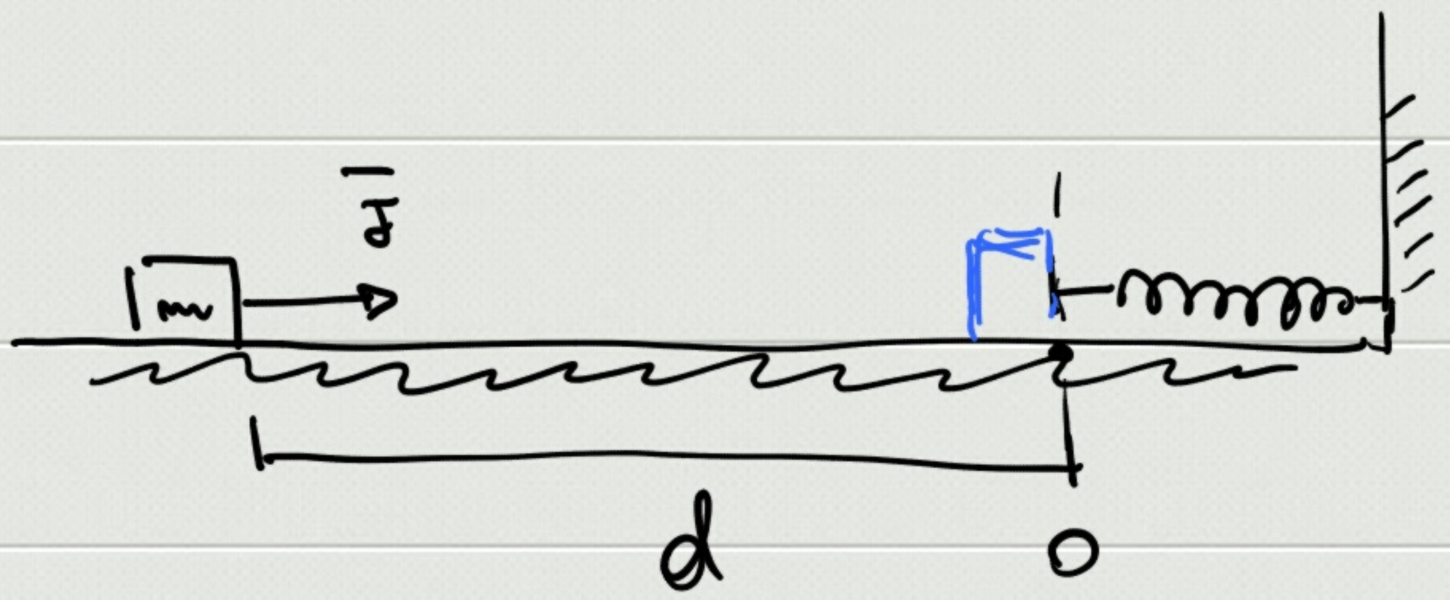


$d = 2\ m$

$m = 1\ kg$

$J = 4\ Ns$

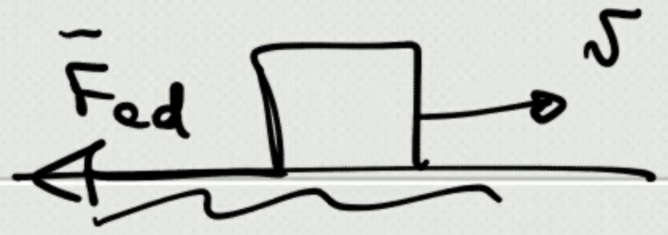
$\mu_d = 0.3$

$K = 200\ N/m$

$\Delta x_{max} = ? \Rightarrow x_{max} = ?$

$$\bar{J} = \int \bar{F}\, dt = \Delta \bar{p} = \bar{p} - \cancel{\bar{p}_0} = m \bar{v}_0$$

$$v_0 = \frac{J}{m} = 4\ m/s$$



$$-\mu_d \cancel{m} g = \cancel{m} a \Rightarrow a = -\mu g$$

$$\boxed{v^2 = v_0^2 + 2ad} \Rightarrow v^2 = v_0^2 - 2\mu_d g d \Rightarrow$$

$v = 2\ m/s$

$$W_{mc} = \Delta E_m$$

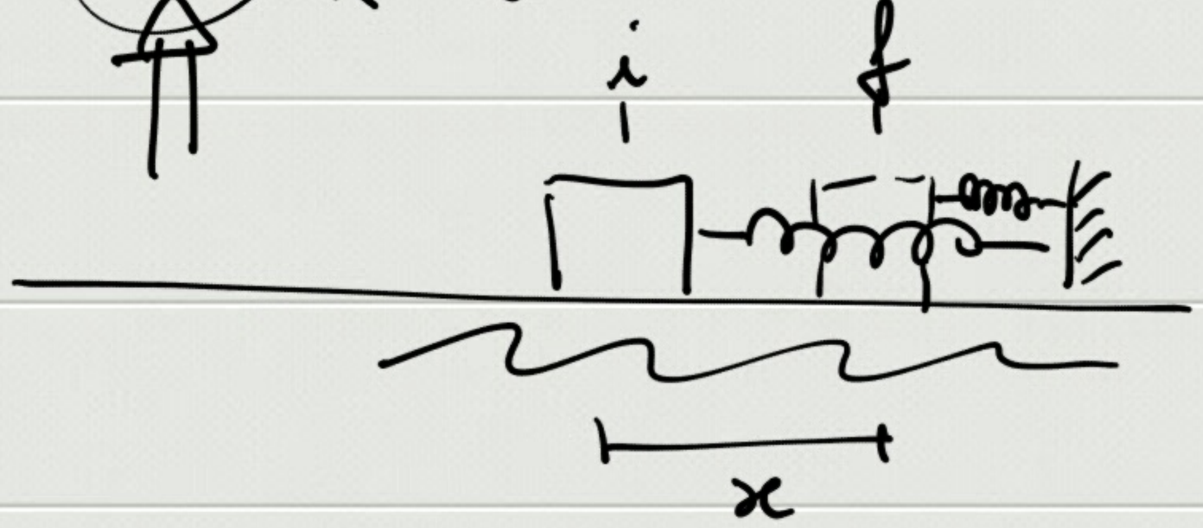
$$-\mu_d \cancel{m} g\, d = \frac{1}{2}\cancel{m} v^2 - \frac{1}{2}\cancel{m} v_0^2$$

- $\frac{1}{2}kx^2 = \frac{1}{2}mv^2$

- $-\mu_d mg x = \frac{1}{2}kx^2 - \frac{1}{2}mv^2$ *

- $0 = v^2 - 2\frac{kx}{m}x$

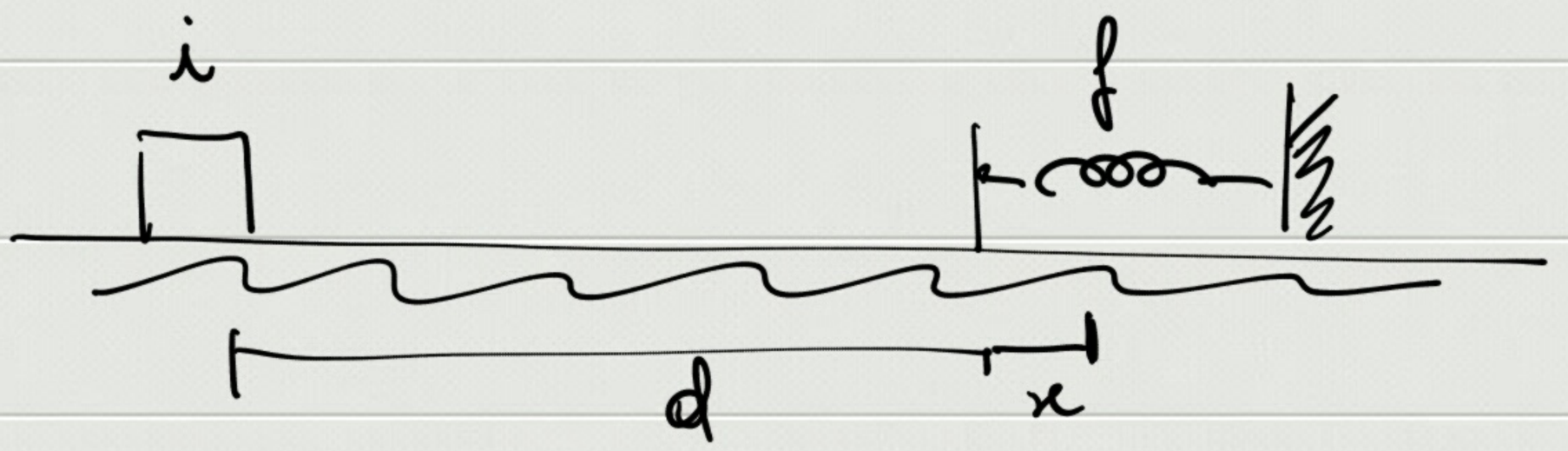
- $0 = v^2 - 2\left(\frac{kx}{m} + \mu_d g\right)x$ $\left[v_f^2 = v_i^2 + 2al\right]$



$$W_{nc} = \Delta E_m \Rightarrow -\mu_d mg x = \frac{1}{2}kx^2 - \frac{1}{2}mv^2$$

$$x^2 + \frac{2\mu_d mg}{k}x - \frac{mv^2}{k} = 0$$

$$x = -\frac{\mu_d mg}{k} \pm \sqrt{\left(\frac{\mu_d mg}{k}\right)^2 + \frac{mv^2}{k}} = 0.132\ m$$



$$W_{nc} = \Delta E_m \Rightarrow -\mu_d mg(d+x) = \frac{1}{2}kx^2 - \frac{1}{2}mv_0^2$$