$m\vec{g}$ (downward)

$\vec{F}$ ← m_1 (on table with pulley)

m_2 (hanging)

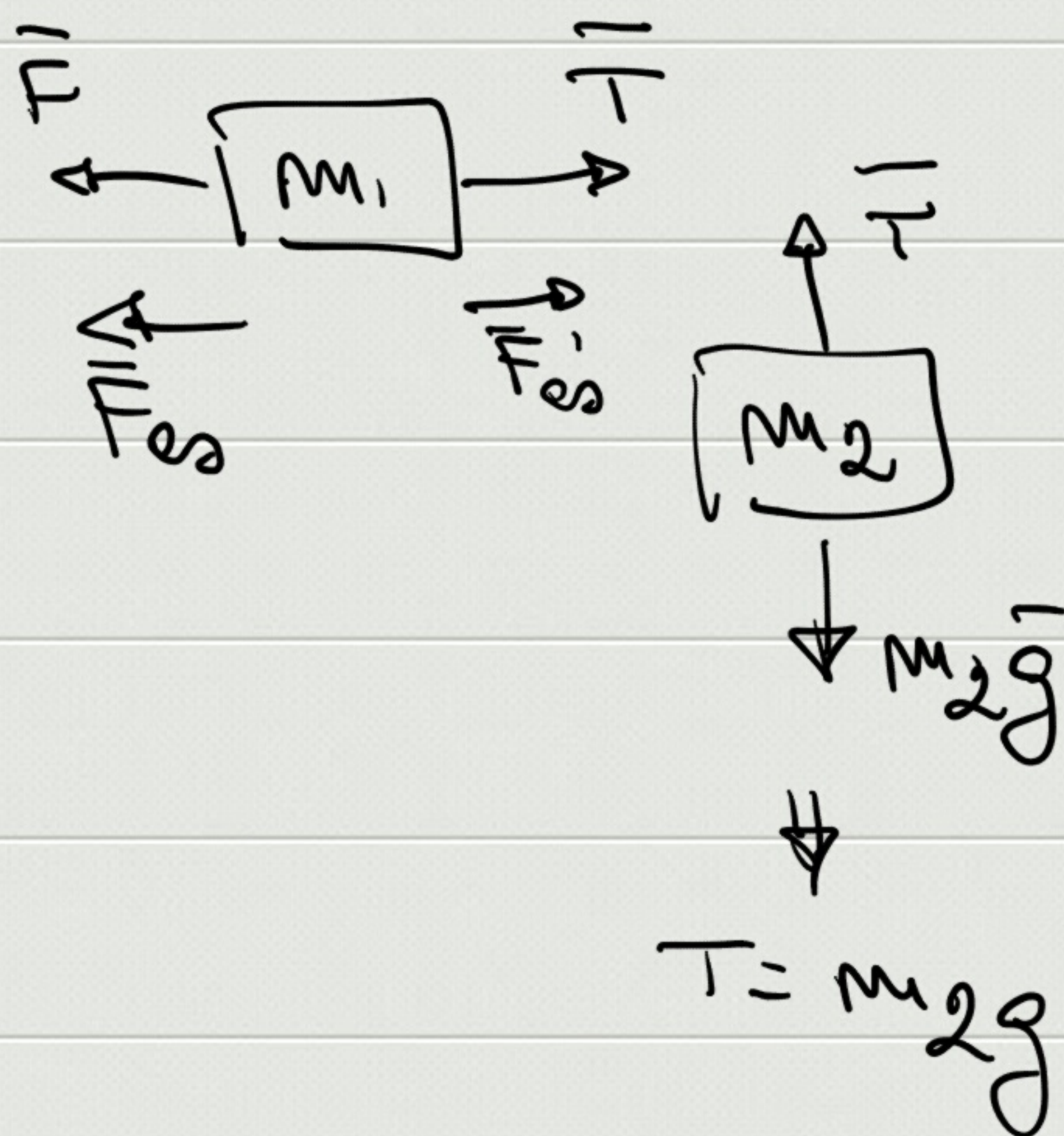$m_1 = 10 \ kg$

$m_2 = 5 \ kg$

$\mu_s = \mu_d = 0.4$

Statica

$F = ?$; eq. statico

$$\begin{cases} \cancel{F = T} \\ F - T - F_{es} = 0 \quad * \\ \cancel{F - T + F_{es} = 0} \quad * \\ \cancel{F = \mu_s m_1 g} \end{cases}$$

$\vec{F}$ ← m_1 → $\vec{T}$

$\vec{F}_{es}$ ← (under m_1 left), $\vec{F}_{es}$ (under m_1 right)

m_2 with $\vec{T}$ ↑ and $m_2 \vec{g}$ ↓

$T = m_2 g$
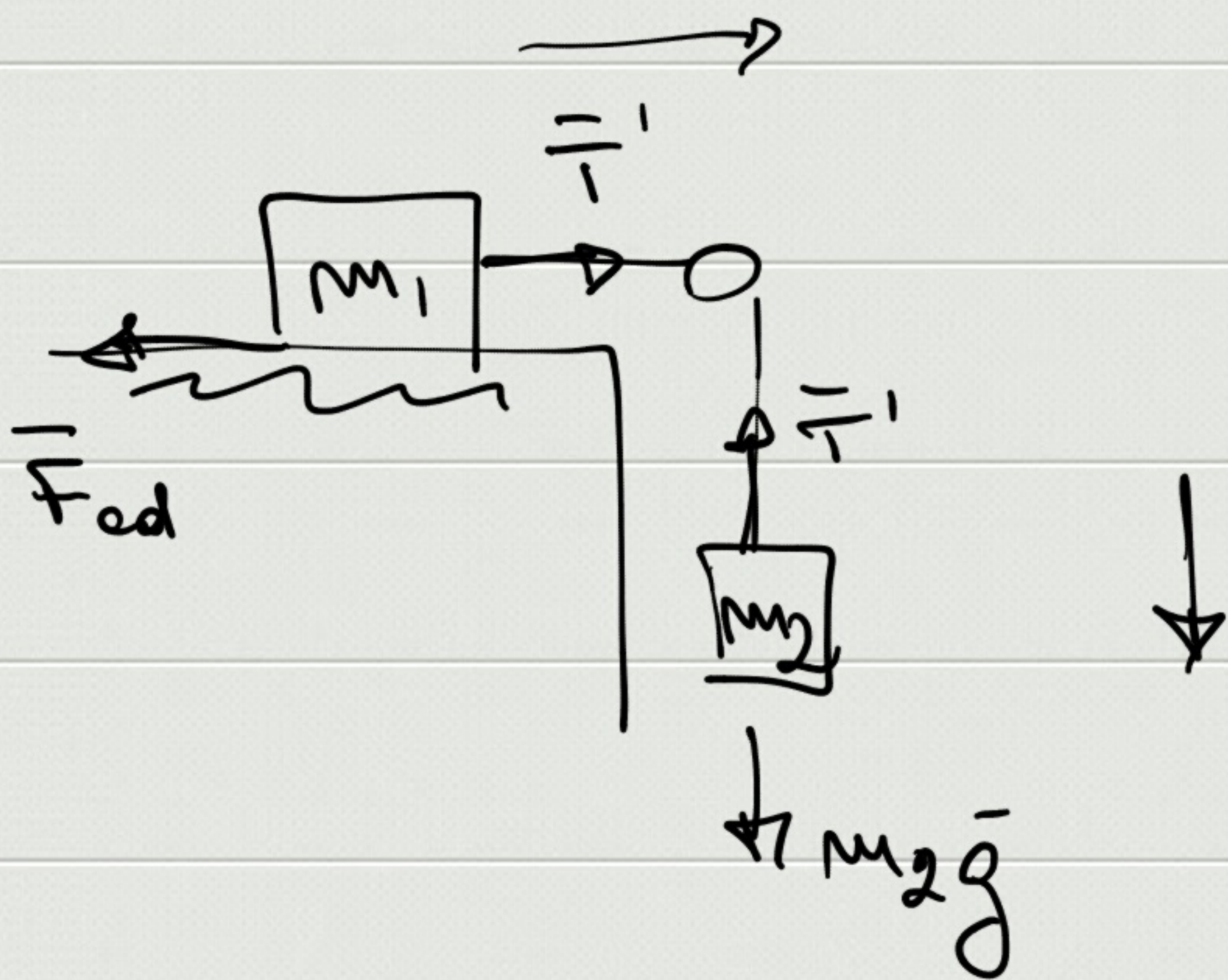
$F_{es} = F - m_2 g \leq F_{es,max} = \mu_s m_1 g$

$$F \leq (\mu_s m_1 + m_2) g = 88.2 \ N \quad \searrow F_{max}$$

$F_{es} = m_2 g - F \leq F_{es,max} = \mu_s m_1 g$

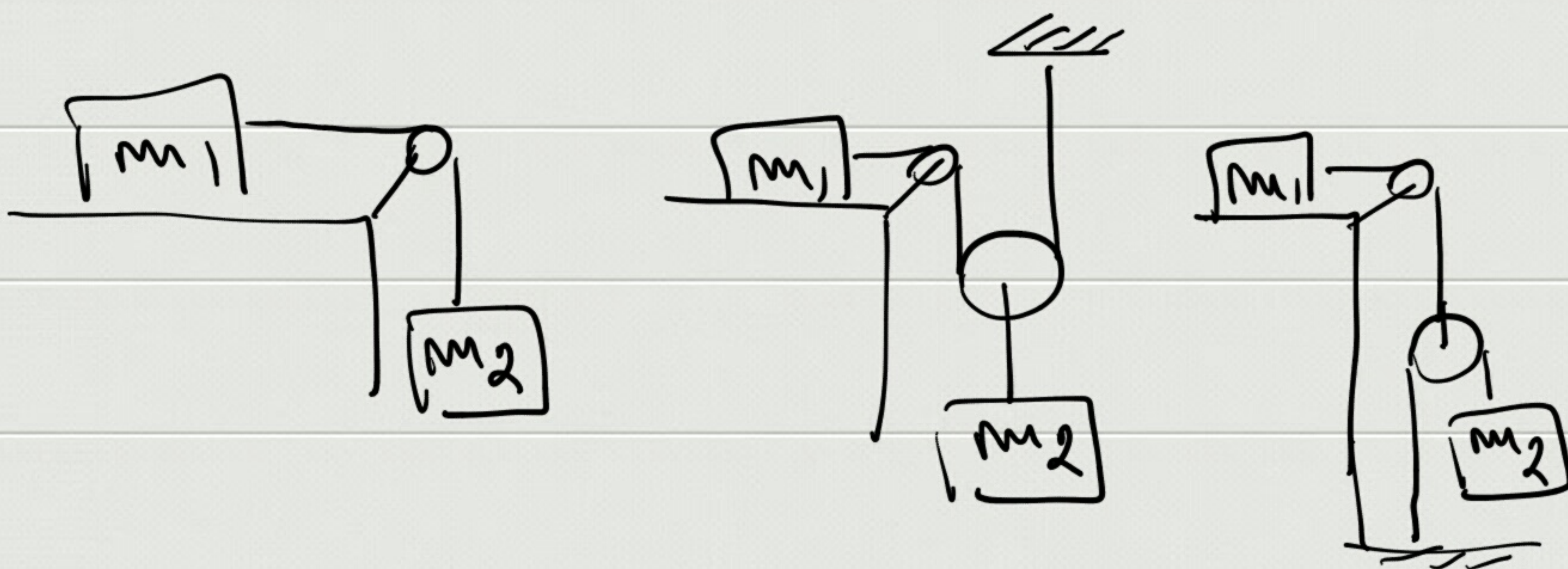$$F \geq (m_2 - \mu_s m_1) g = 9.8 \ N \quad \searrow F_{min}$$

$\overline{\overline{T}}{}^{1}$

m_1

$\overline{F}_{ed}$

$\overline{\overline{T}}{}^{1}$

m_2

$\uparrow m_2 \overline{g}$

$$\begin{cases} T^{1} - \mu_d\, m_1 g = m_1 a \\ m_2 g - T^{1} = m_2 a \end{cases}$$

$$\left(m_2 - \mu_d\, m_1 \right) g = \left(m_1 + m_2 \right) a \implies$$

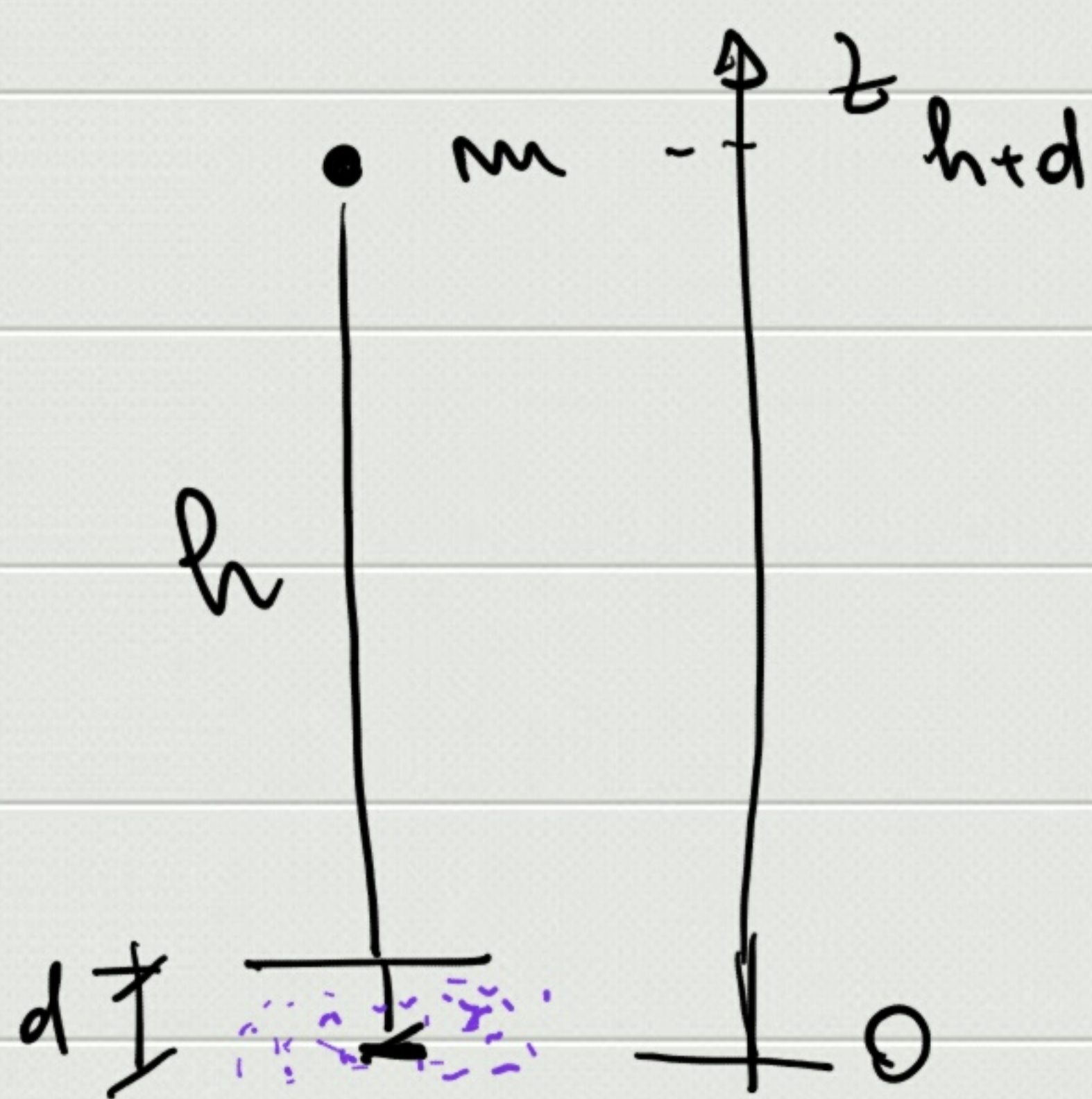$$a = \frac{m_2 - \mu_d\, m_1}{m_1 + m_2} = 0.65 \; m/a^2$$

$$a_1 = ?$$

$$\boxed{a_1 > g}$$

$$\left(\frac{m_2}{m_1}\right)_{min} = ?$$

1) $\quad a_1 = \dfrac{m_2}{m_1 + m_2}\, g$

2) $\quad a_1 = \dfrac{2m_2}{4m_1 + m_2}\, g \quad * \quad \left(\dfrac{m_2}{m_1} > 4\right)$

3) $\quad a_1 = \dfrac{2m_2}{m_1 + 4m_2}\, g$

$$m = 0.1 \text{ kg}$$

$$h = 3 \text{ m}$$

$$d = 0.03 \text{ m}$$

$$F_{sabbie} = \cos t = ?$$

$$* - \begin{cases} v^2 = 2gh \\ 0 = v^2 + 2(g - a_s)d \end{cases} \qquad \downarrow z \qquad v_f^2 = v_i^2 + 2a \Delta x$$

$$* - \qquad -F_s d = -mg(h+d) \qquad W_{mc} = \Delta E_m \; [(h+d)]$$

$$* - \begin{cases} mgh = \dfrac{1}{2} mv^2 \\ -F_s d = -(mg\,d + \dfrac{1}{2} mv^2) \end{cases} \qquad \begin{array}{l} E_m = \cos t \\ W_{mc} = \Delta E_m \; [d] \end{array}$$

$$* - \qquad W_{peso} + W_{F_s} = 0 \qquad W_{TOT} = \Delta E_k$$

$$0 = 2gh + 2gd - 2a_s d \Rightarrow a_s = g \frac{h+d}{d}$$

$$F_s = m\,a_s = mg\,\frac{h+d}{d} = 98 \text{ N}$$

$$-\Delta E_{p,peso} + W_{F_s} = 0 \Rightarrow -(0 - mg(h+d)) - F_s d = 0$$