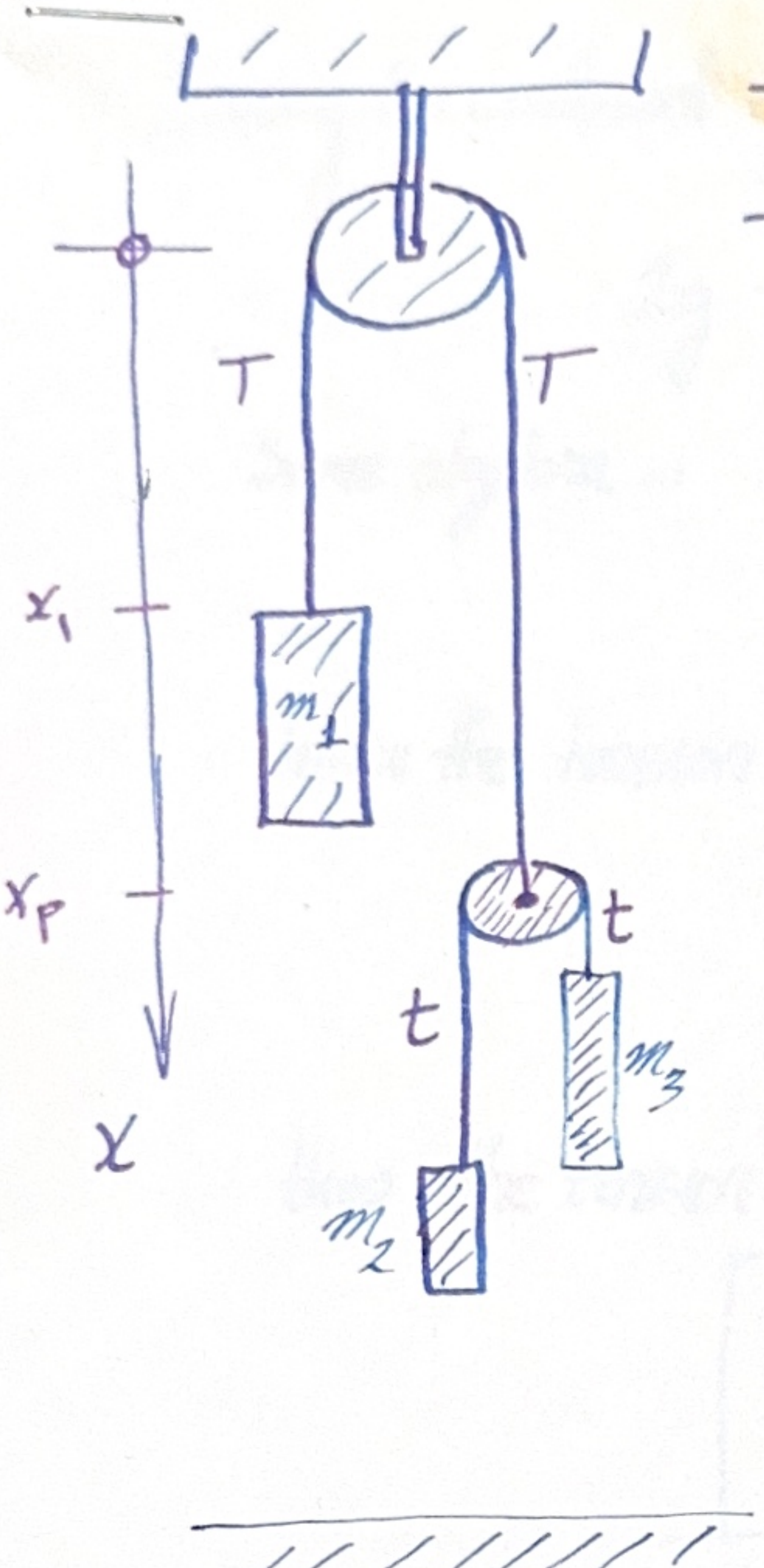

- All pulleys are frictionless & massless.
- $m_1 > m_2 + m_3$ & $m_3 > m_2$

a_1 = downward acceleration of m_1
a_p = downward acceleration of the right pulley.

$$a_p = -a_1$$

x_1, x_2, x_3, x_p = positions of m_1, m_2, m_3 & pulley
the string connecting m_2 & m_3 has a fixed length, ℓ; therefore

$$(x_2 - x_p) + (x_3 - x_p) = \ell + \pi r_p$$

two time derivatives yield

$$a_2 + a_3 - 2a_p = 0$$

or

$$a_2 + a_3 = 2a_p = -2a_1$$

Applying 2^{nd} Law to m_2 & m_3:

$$m_2 g - t = m_2 a_2 \longrightarrow a_2 = g - \frac{t}{m_2}$$
$$m_3 g - t = m_3 a_3 \longrightarrow a_3 = g - \frac{t}{m_3}$$

SUBST. into Constraint

$$\left(g - \frac{t}{m_2}\right) + \left(g - \frac{t}{m_3}\right) = -2a_1$$

$$\boxed{2g - t\left(\frac{1}{m_2} + \frac{1}{m_3}\right) = -2a_1}$$

Pulley is massless $\Rightarrow \Sigma F_p = 0 \Rightarrow T = 2t$

2^{nd} Law on m_1: $m_1 g - T = m_1 a_1$

$$m_1 g - 2t = m_1 a_1 \longrightarrow a_1 = g - \frac{2t}{m_1}$$