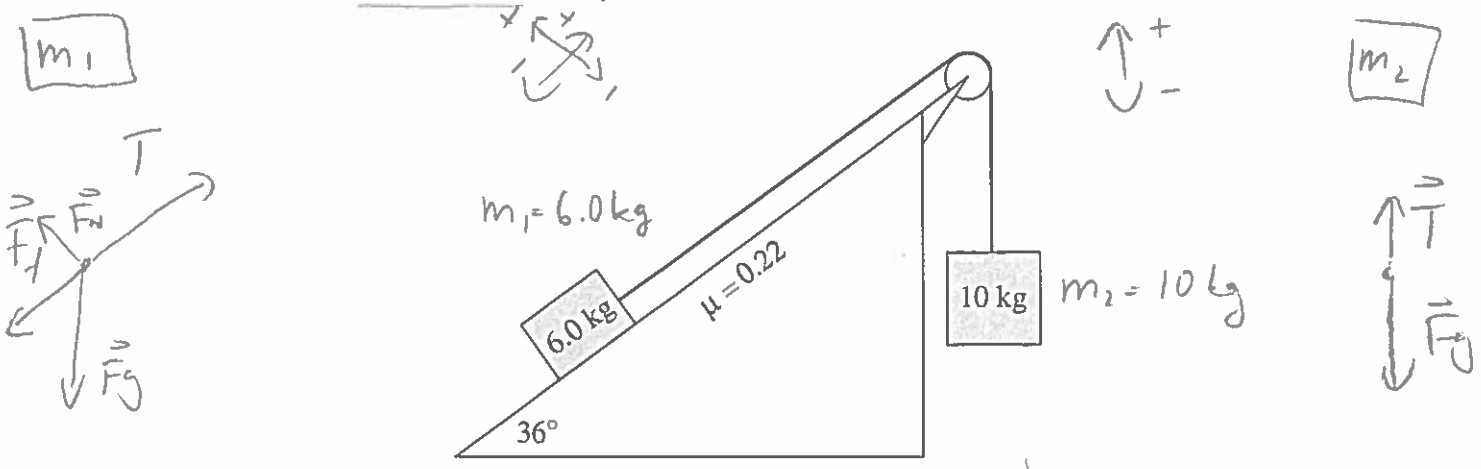
$a_1 = a_2$!

1. Determine the acceleration of the system of masses shown below when it is released. **(7 marks)**



m_1 :

$\vec{F}_{g\perp} = (6.0)(9.8)(\cos 36°)$

$= 47.5702\ N$

$\vec{F}_N = 47.5702\ N$

$\vec{F}_f = -F_N(0.22)$

$= -10.4654\ N$

$\vec{F}_{g\parallel} = -(6.0)(9.8)(\sin 36°)$

$= -34.5618\ N$

$m_1\vec{a} = \vec{T} + \vec{F}_g + \vec{F}_N + \vec{F}_f$

$(6.0)a = T - F_{g\parallel} - F_f$

$a = \dfrac{T - 34.5618 - 10.4654}{6.0}$

m_2

$F_g = (10)(9.8)$

$= 98\ N$

$T = ?\ N$

$-m_2 a = T - F_g$

$a = \dfrac{T - 98}{-10}$

$\dfrac{T - 45.0272}{6.0} = \dfrac{T - 98}{-10}$

$-10T + 450.0272 = 6T - 588$

$-16T = -1038.0272$ $\Rightarrow$ $T = 64.892\ N$

$a = \dfrac{64.892 - 98}{-10}$

$a = 3.3\ m/s^2$