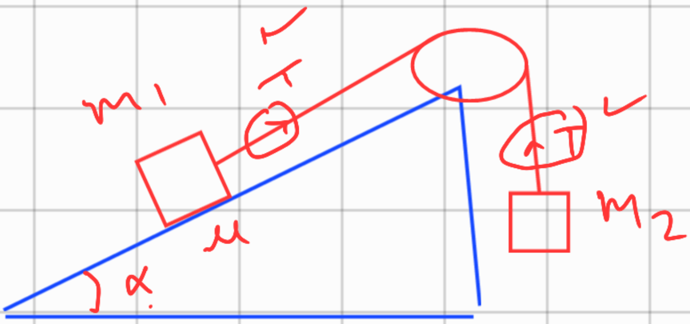


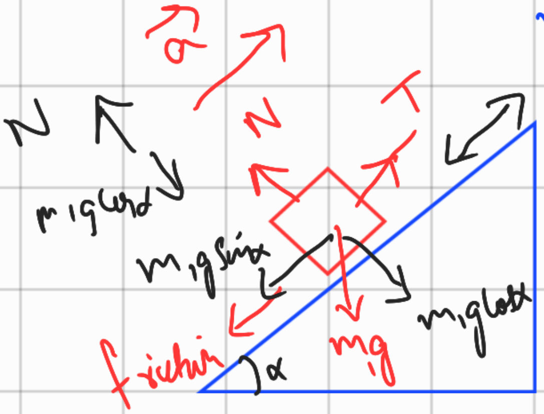
a, T

① for m_2 going down

FBD

$m_2 g > T$

$m_2 g - T = m_2 a$ — ①



$T > m_1 g \sin\alpha + \text{friction}$

$T > m_1 g \sin\alpha + \mu N$

$N = m_1 g \cos\alpha$

$T > m_1 g \sin\alpha + \mu m_1 g \cos\alpha$

since $m_2 g > T$

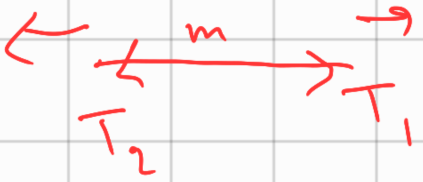
$\therefore m_2 g > m_1 g \sin\alpha + \mu m_1 g \cos\alpha$

$\div$ by $m_1 g$

$$\frac{m_2}{m_1} > \sin\alpha + \mu \cos\alpha$$

Home work: for m_2 going up calculate $\frac{m_2}{m_1}$

imp point

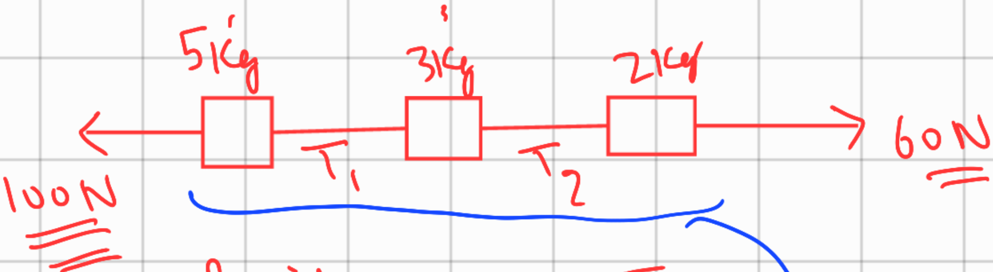


$$T_1 - T_2 = ma$$

$T \neq T_2$ if $m \neq 0$

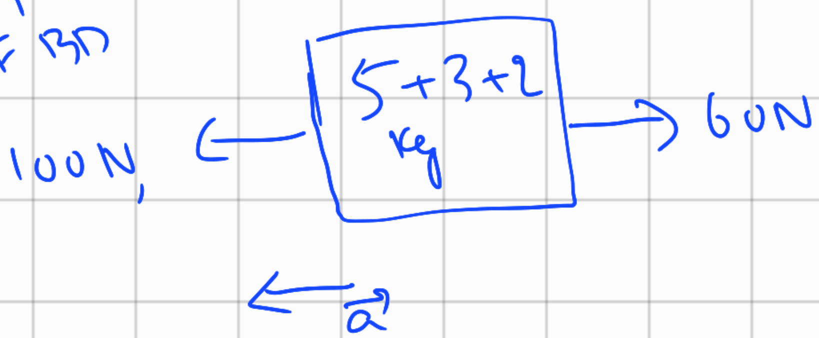
so we have $T_1 = T_2$ only if we assume string to be massless

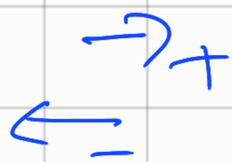
Q



find T_1 & T_2

composite FBD

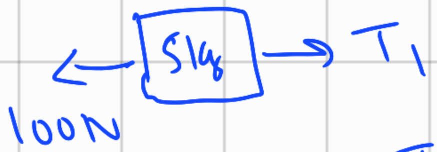




$$100N - 60N = (5+3+2)\,a$$

$40 = 10a$ $a = 4\ m/s^2$

individual FBD



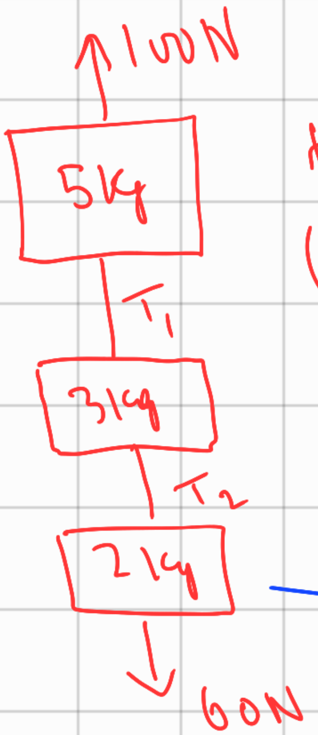
$$100 - T_1 = 5a$$

$100 - T_1 = 20$ $T_1 = 80N$

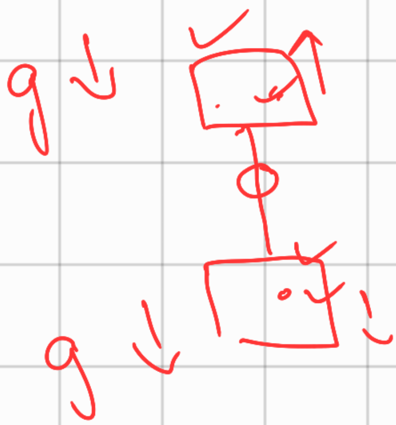
$T_2 - 60 = 2a$

$T_2 = 8 + 60 = 68\,N$

① =



take ($g \approx 10\,m/s^2$)

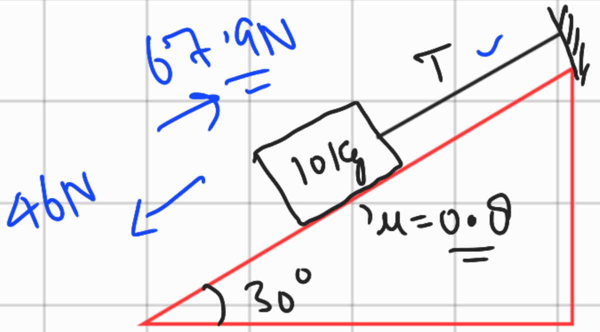


from composite FBD $a = 6$

$80 - T_2 = 2 \times 6$

$-T_2 = 12 - 80$

$T_2 = 68\,N$



Q calculate frictional force & Tension force

Sol $f = \mu N = 0.8\, mg\cos 30^\circ$

$0.8 \times 10 \times 9.8 \times \frac{\sqrt{3}}{2} \approx 67.9\text{ N}$

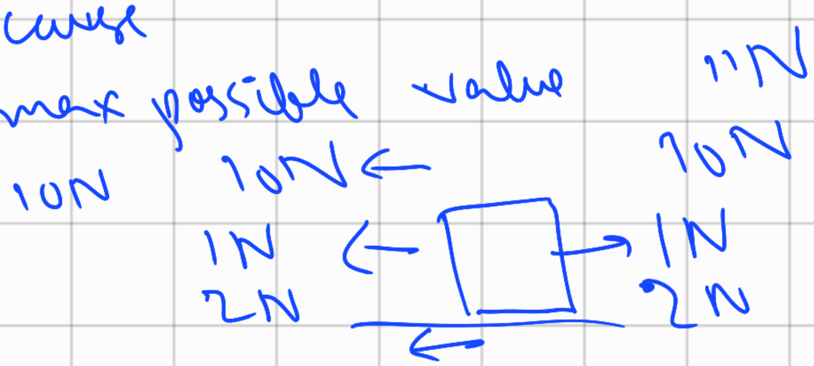
the force trying to pull block downward along incline

$mg\sin 30^\circ = 10 \times 9.8 \times \frac{1}{2} = \frac{98}{2} = 46\text{ N}$

this doesn't make sense

because

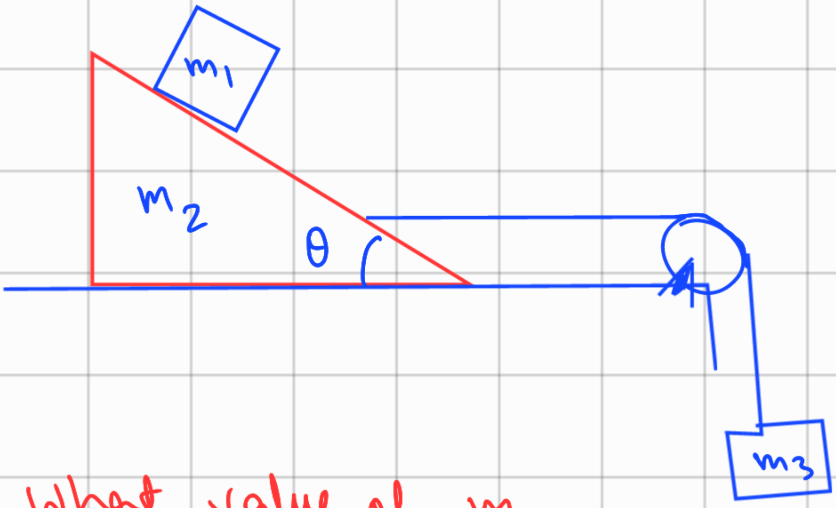
this is the max possible value



$f_{max} = 10\text{ N}$

∴ frictional force = 46 N

∴ T = 0



① for what value of m_3
m_1 is at rest with respect to m_2