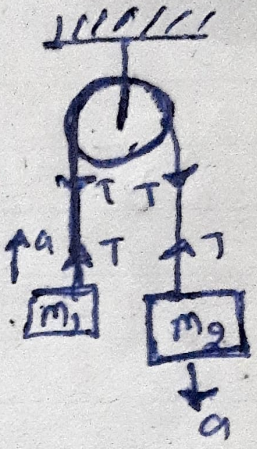
PULLEY

* For Atwood Machine

$$a = \frac{(m_2 - m_1)\,g}{m_1 + m_2}$$

$$T = \frac{2 m_1 m_2 g}{m_1 + m_2}$$



Constraint Relation

Work done by Tension is zero

$$W = F \times d \times \cos\theta$$

$$W_{net} = 0$$

Limiting Friction

Max. value of Static friction

When coldwelds are at the verge of slipping

$$f_L = \mu_s N$$

μ_s → coefficient of Static friction

Impulse :- $\vec{I} = \vec{F}_{avg.}\, t$ — $\vec{I}$ is equal to area under F-t graph

ESTIMATE

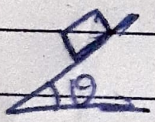
Kinetic Friction

It acts when one object actually starts slipping over another.

$$f_K = \mu_K . N$$

μ_K → Coefficient of Kinetic Friction

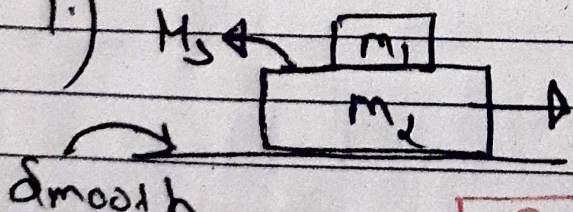
Angle of Repose → Maxi. angle so that the block doesn't slip



$$\theta = \tan^{-1} \mu_S$$

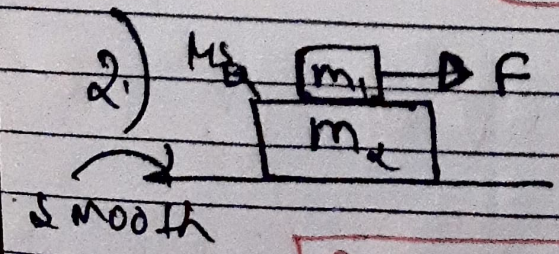
Two Block System

1.)



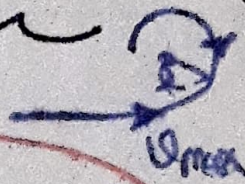
$$F_{max} = \mu_S (m_1 + m_2) g$$

2.)



$$F_{max} = \mu_S \frac{m_1}{m_2} (m_1 + m_2) g$$

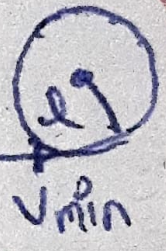
Vertical Circular Motion



If $v_{max} = \sqrt{2gl}$

particle will oscillate

If $v_{min} = \sqrt{5gl}$



particle will keep looping the Loop

$$\vec{F} = \frac{d\vec{p}}{dt}$$ [First Law of Motion]