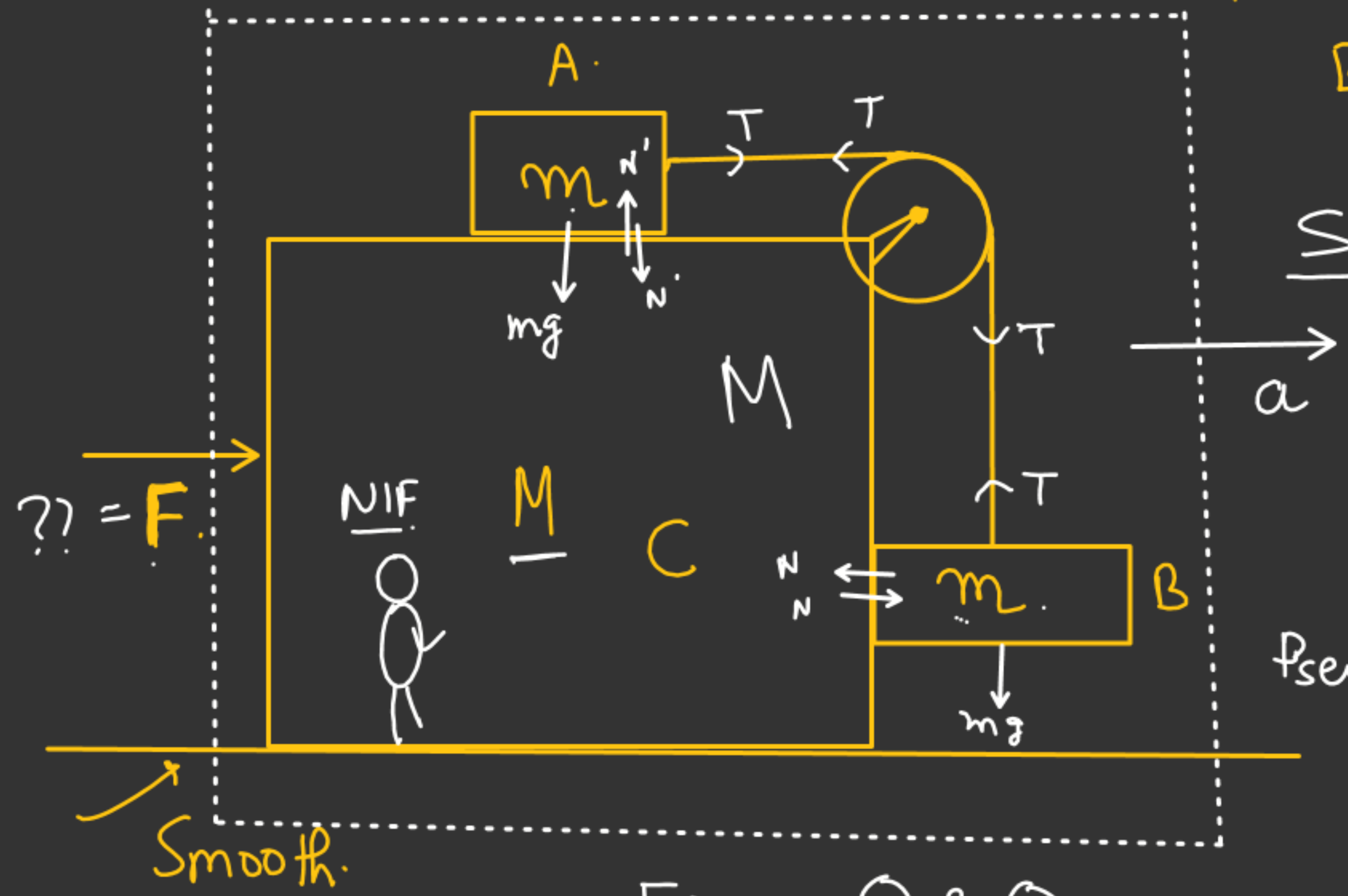
Nishant Jindal

\# Find 'F' so that block A and B doesn't have any relative motion w.r.t C. All Surfaces are Smooth.



Sol^n :- W.r.t C

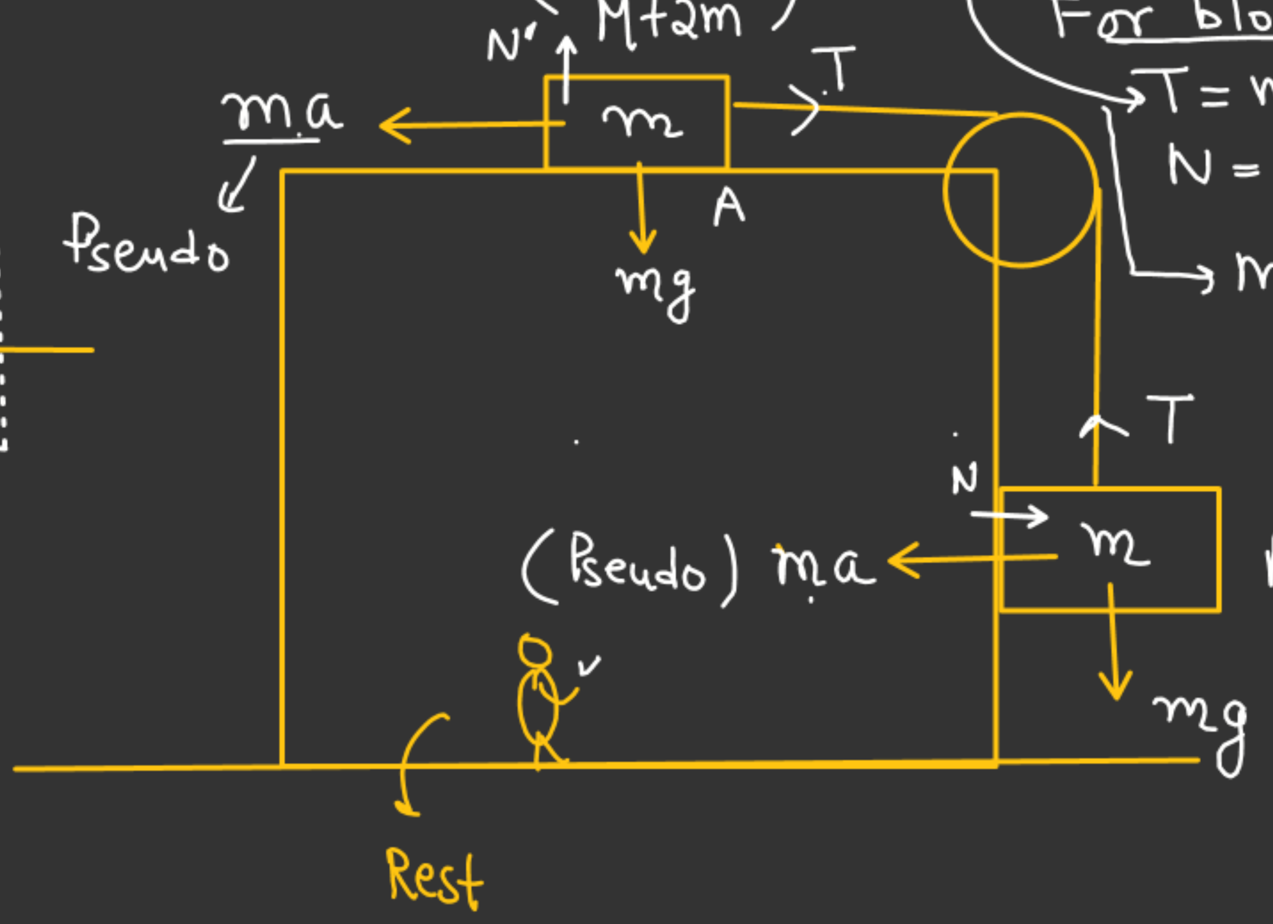
$$\underline{a} = \left(\frac{F}{M+2m}\right) — ①$$

For Block A
$[T = ma]$, $[N' = mg]$

For block B
$T = mg$ (y-direction)
$N = ma$ (x-direction)

$\to ma = mg$

$\underline{a = g}$ — ②



From ① & ②

$$\frac{F}{M+2m} = g$$

$$F = \underline{g(M+2m)}$$

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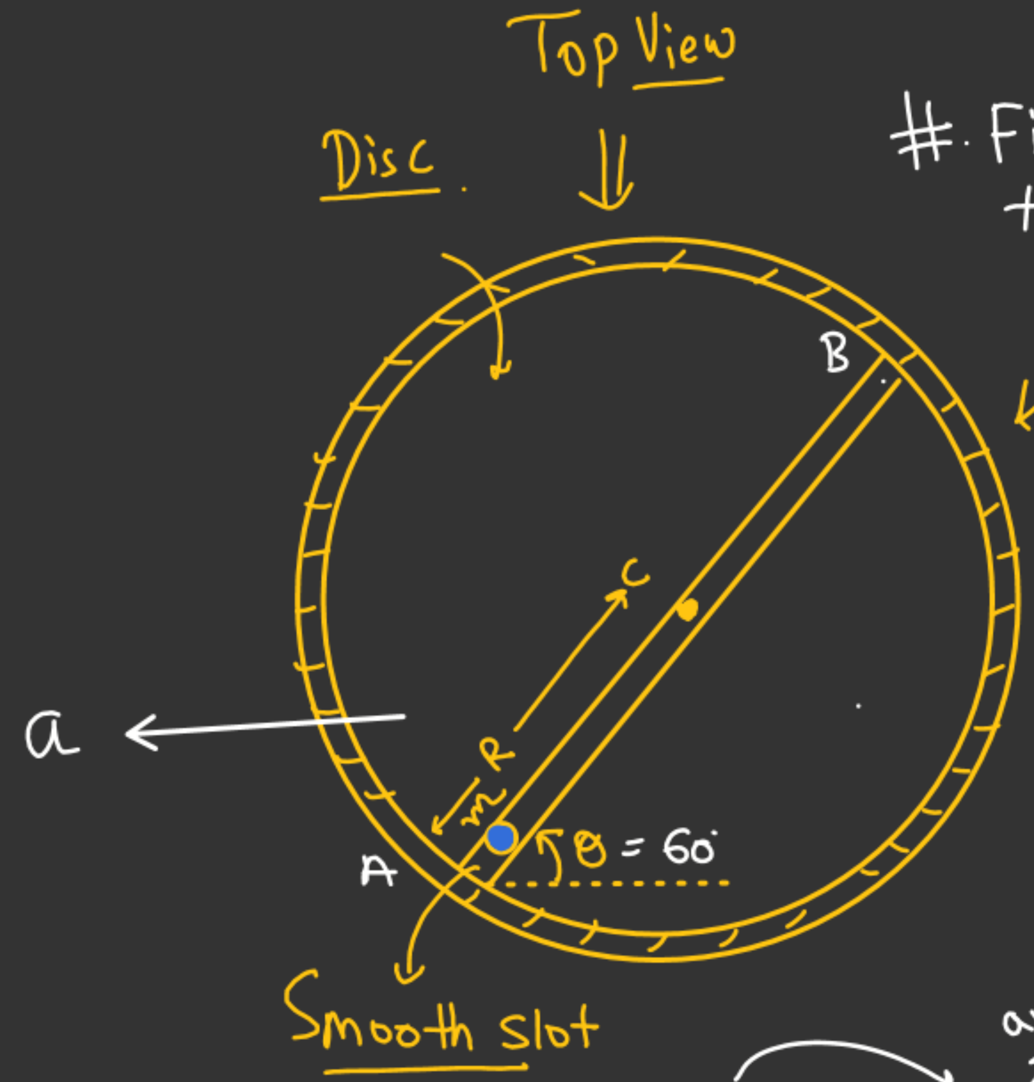
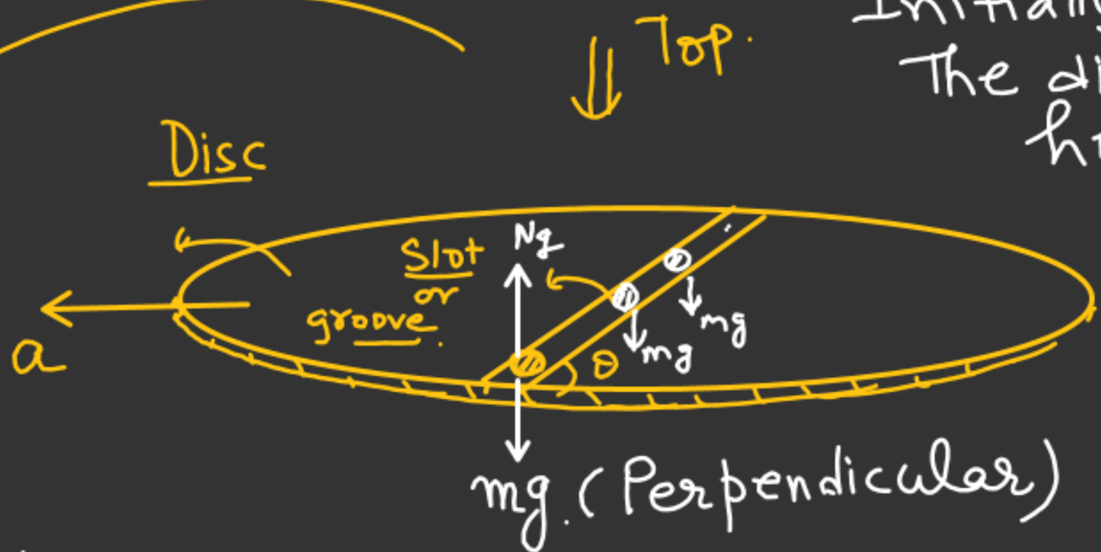
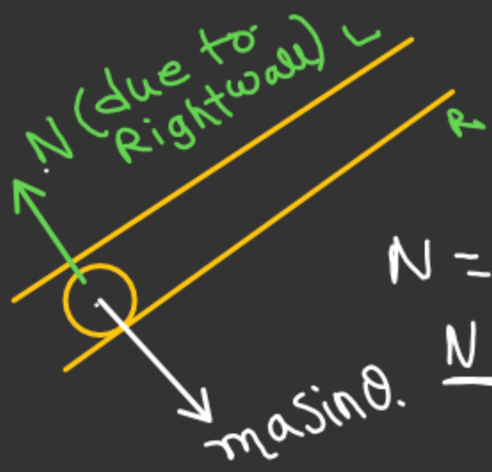


Find Time taken by ball to reach the other diametrical end. disc is acclerated at t=0. Initially disc is at rest. The dis is on the Smooth horizontal plane.





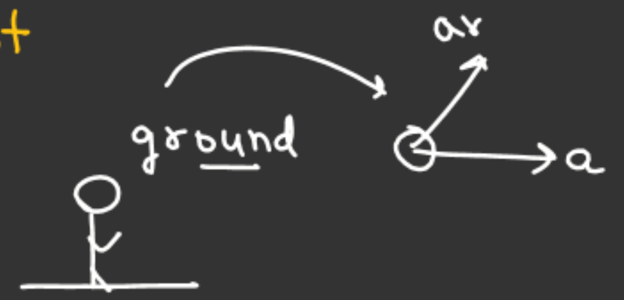
$N = ma\sin 60^\circ$

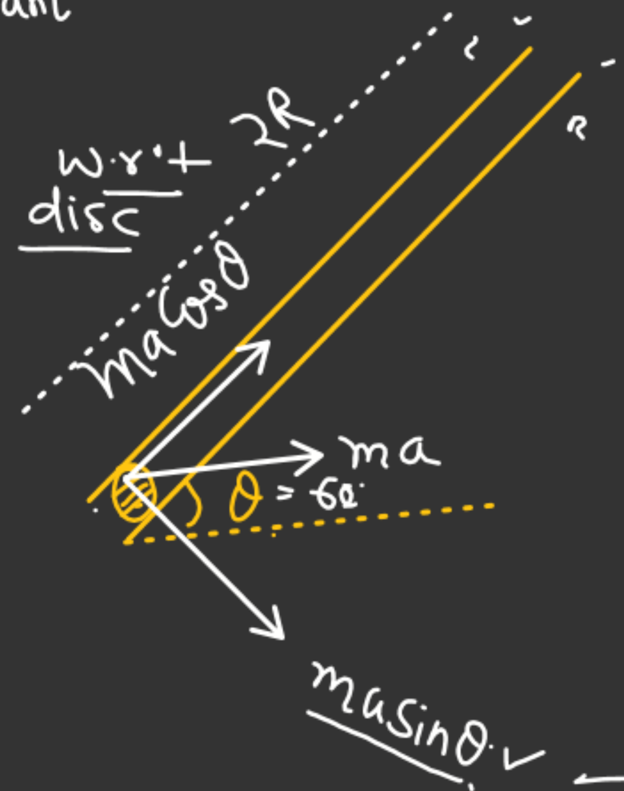
$N = \left(\frac{ma\sqrt{3}}{2}\right)$

$N_g = mg$

due to gravity

constant





$a_r = a\cos\theta = a\cos 60^\circ$

$\left(a_r = \frac{a}{2}\right)$

$u_{rel} = 0$

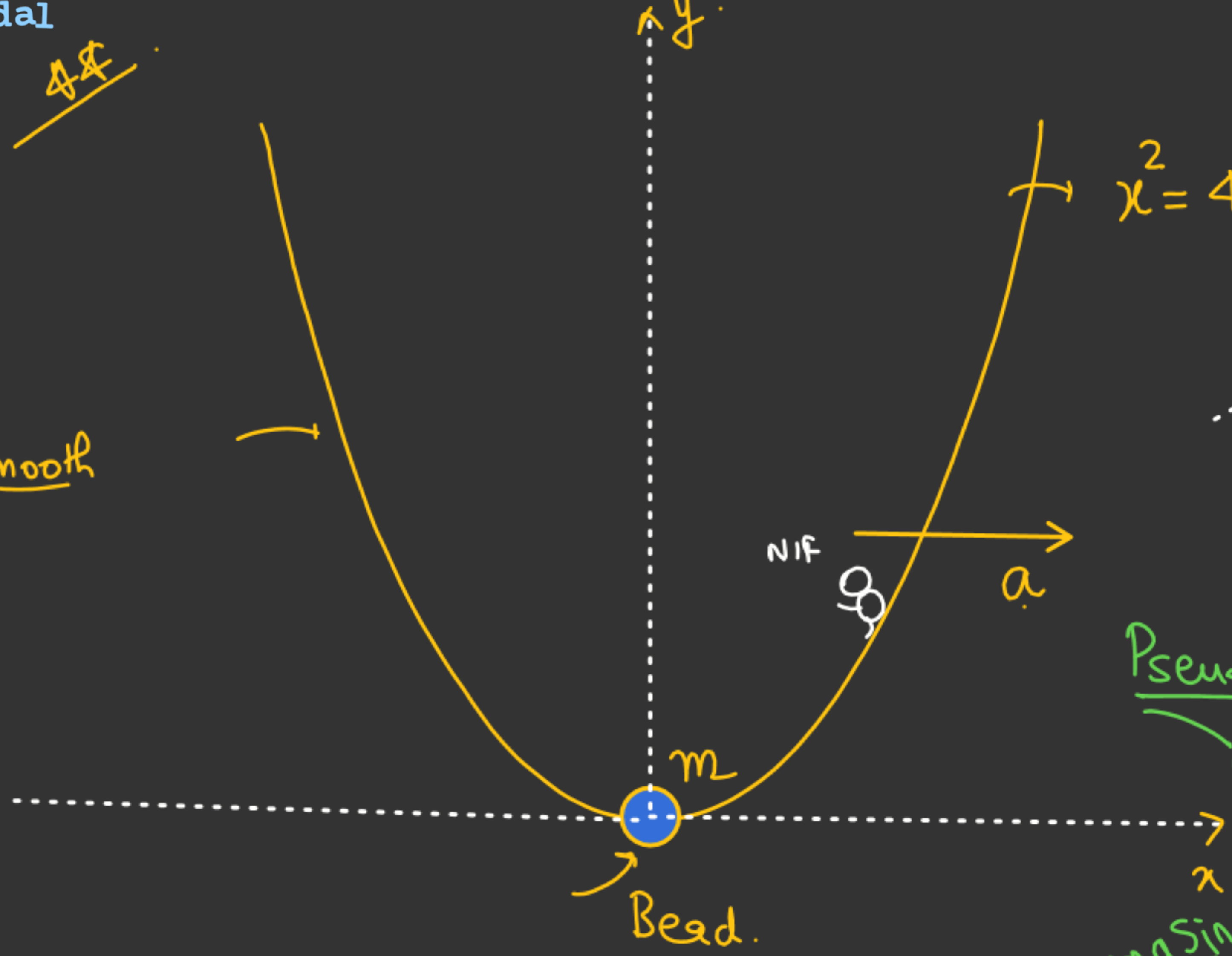
$S = u_{rel}t + \frac{1}{2}a_{rel}t^2$

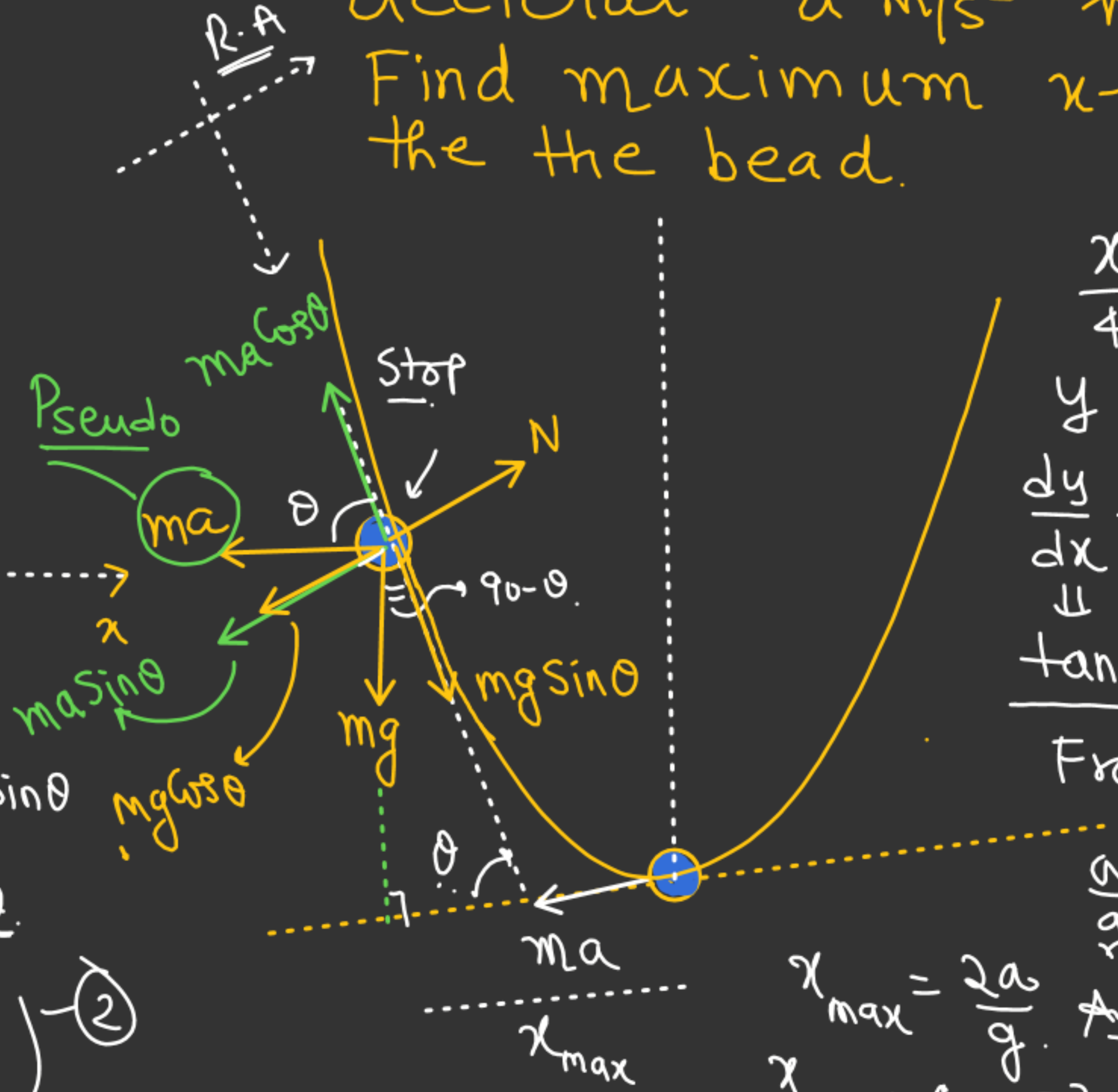
$2R = \frac{1}{2}\left(\frac{a}{2}\right)t^2$

$\sqrt{\frac{8R}{a}} = t$

Nishant Jindal

The parabolic Shape wire is acclerated with Constant Accleration a m/s² horizontally. Find maximum x-co-ordinate the bead.





$\cancel{m}a\cos\theta = \cancel{m}g\sin\theta$

$a = g\tan\theta$

$\left(\tan\theta = \frac{a}{g}\right)$ —②

$\frac{x^2}{4} = y$

$y = \frac{x^2}{4}$

$\frac{dy}{dx} = \frac{2x}{4} = \left(\frac{x}{2}\right)$

$\Downarrow$

$\tan\theta = \left(\frac{x}{2}\right)$ —①

From ① & ②.

$\frac{a}{g} = \frac{x_{max}}{2}$

$x_{max} = \frac{2a}{g}$ Ans

$x_{max} = \frac{a}{5} m s^{-2}$

Nishant Jindal

String - pulley

String :- " Massless "

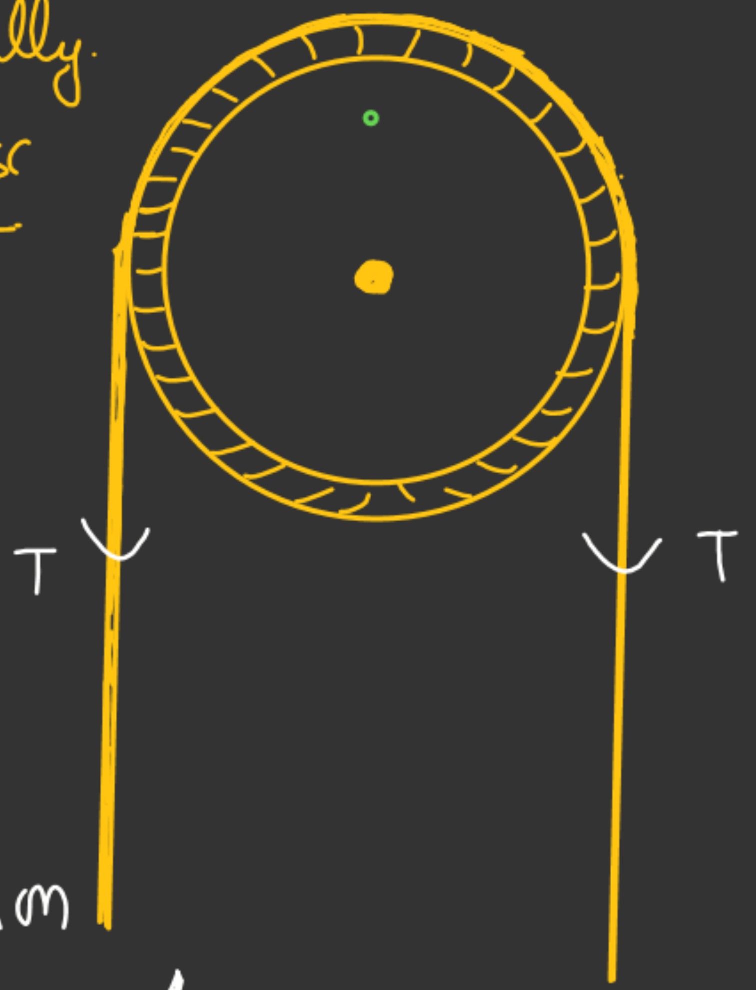
↳ Tension in a string remain same untill & unless string is not changing.

Note :- ** [If massless string passes through frictionless & massless pully then tension is string remain same

Pulley

↳ Masless pully.

↳ friction less



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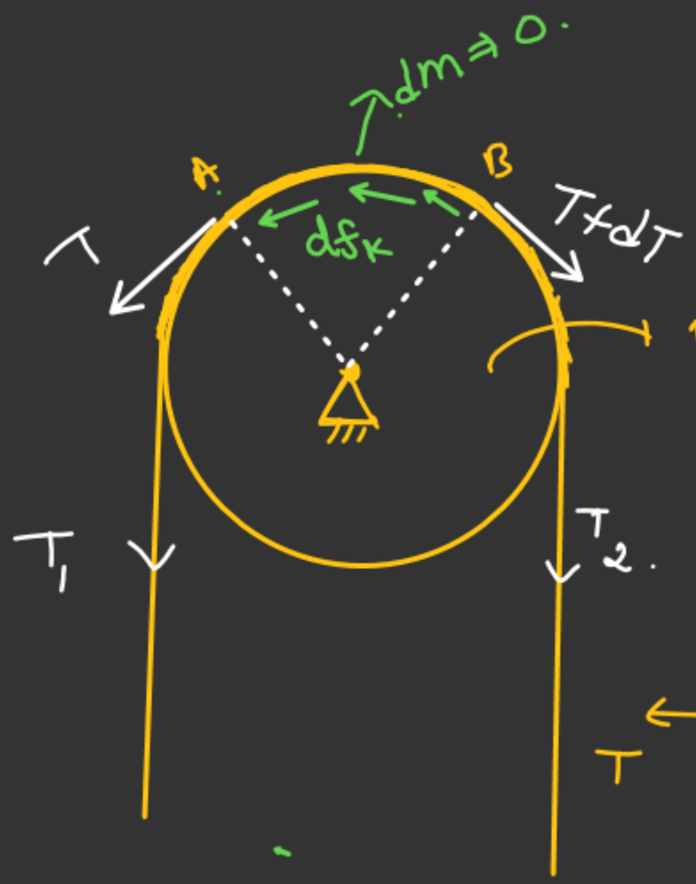


Rough pully.
massless.

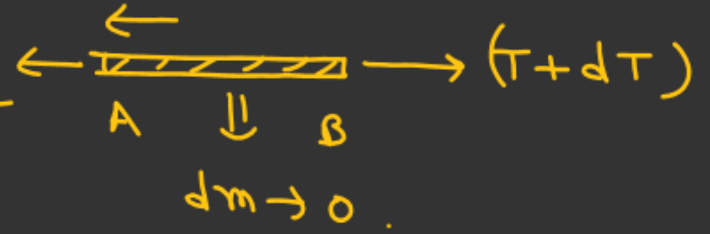
For $T_1 = T_2 = T$

$dT = 0$

$\Rightarrow \boxed{df_K = 0}$.

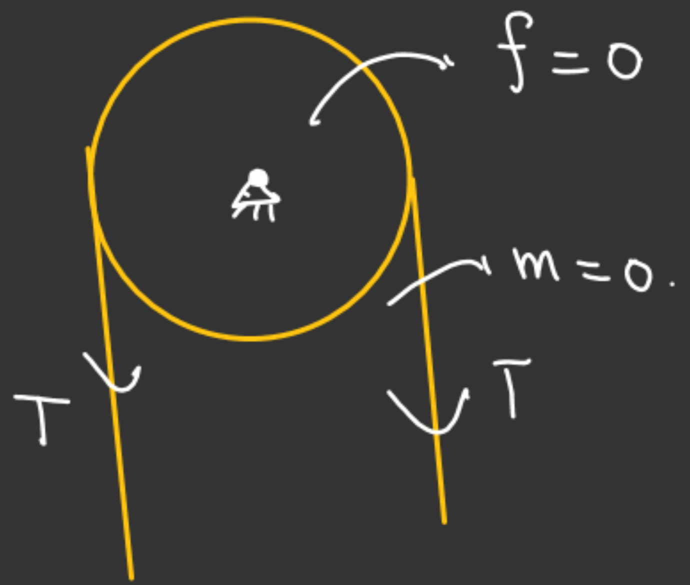
↳ i.e No friction b/w String & pully.

$df_K \Rightarrow$ (friction force)



$$\cancel{T} + df_K = \cancel{T} + dT$$

If pully is rough tension in the string not same. ← $\boxed{df_K = dT}$



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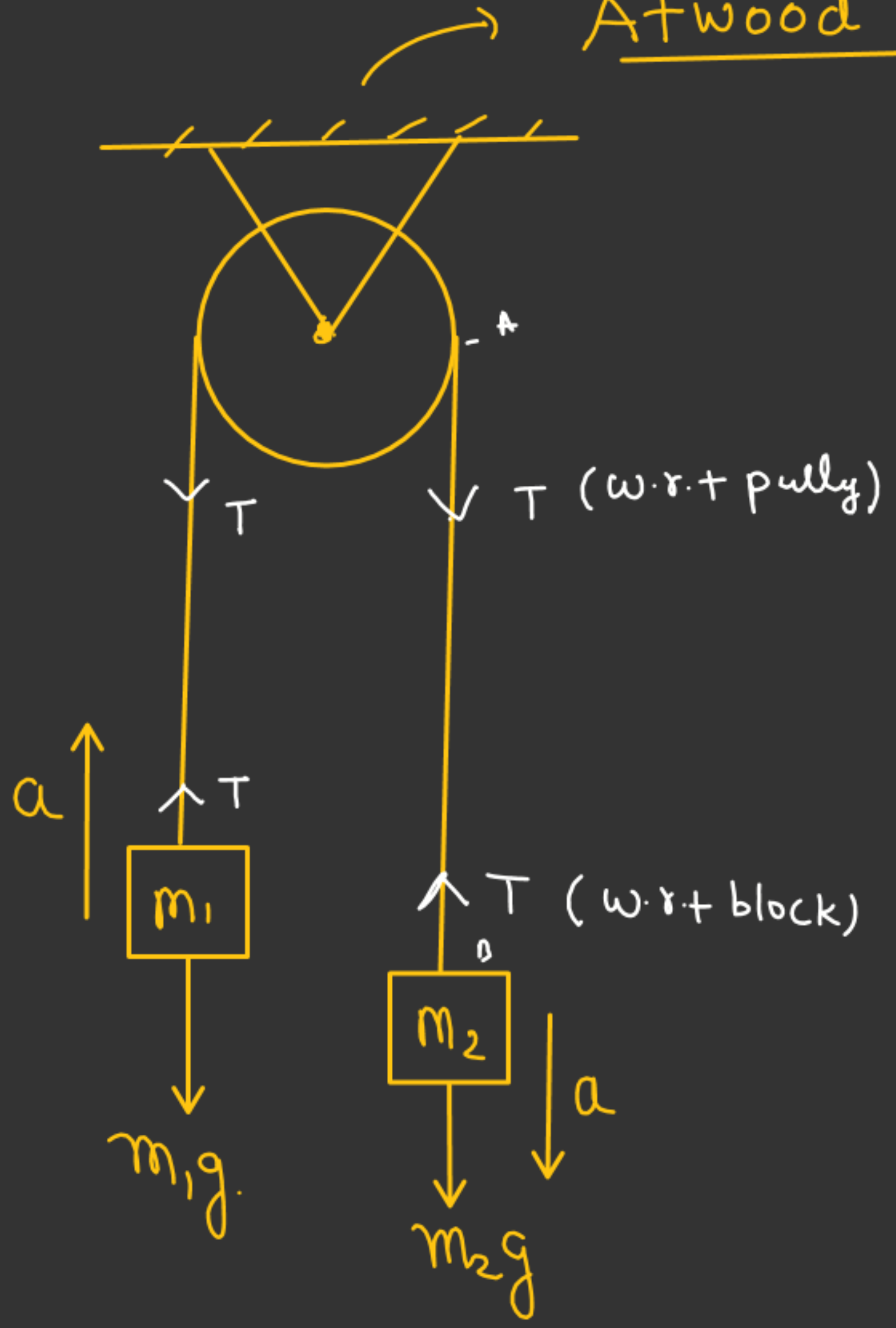
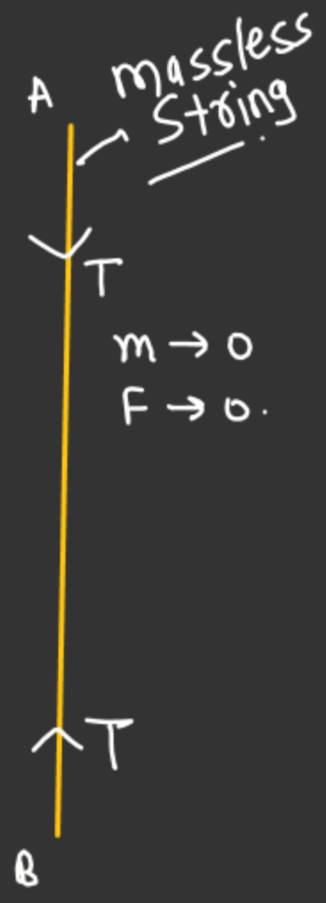
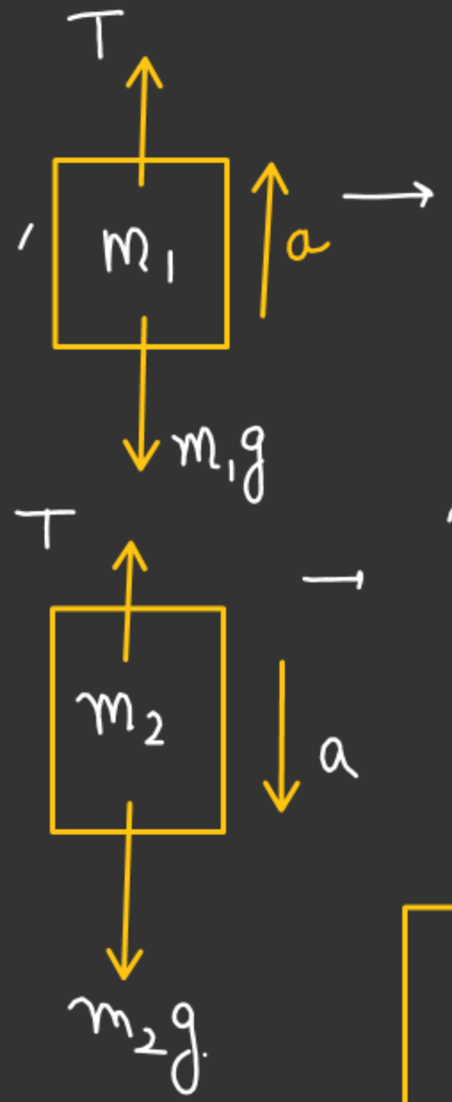
Atwood Machine.







$$T - m_1 g = m_1 a \quad \text{--- (1)}$$

$$m_2 g - T = m_2 a \quad \text{--- (2)}$$

(1) + (2)

$$(m_2 - m_1)g = (m_1 + m_2)a$$

$$\boxed{a = \left[\frac{m_2 - m_1}{m_1 + m_2}\right]g} \quad **$$

$m_2 > m_1$

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