

PRAYAS

JEE 2025

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Lecture - 01

Physics

Laws Of Motion

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Topics *to be covered*

- 1 Newtons Law
- 2 N, mg, T force
- 3 FBD
- 4

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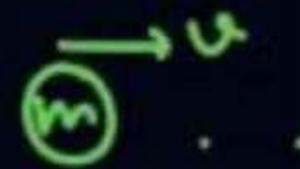


NLM

Inertia → It is the tendency to resist the change.
 It is the property due which a body wants to be in state of rest or in Uniform motion in a straight line

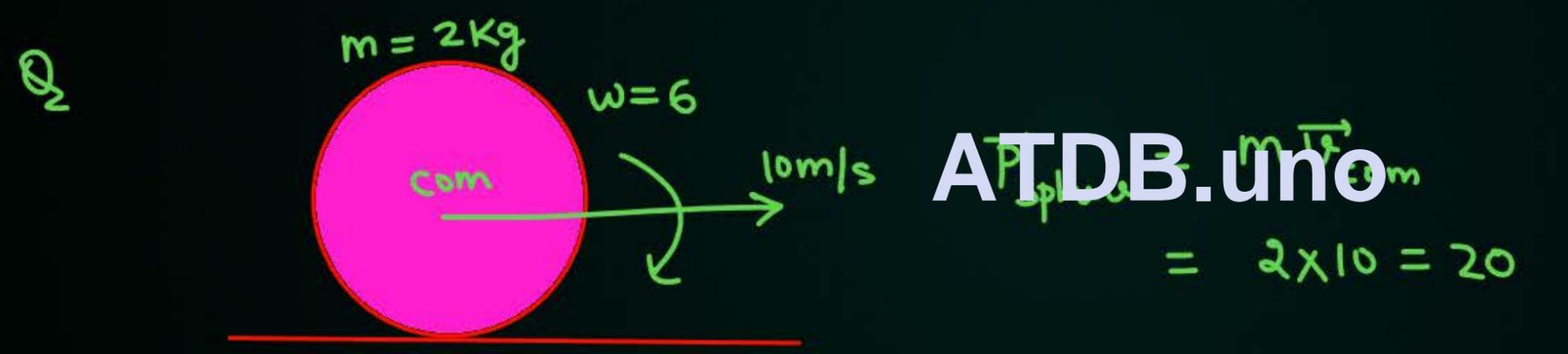
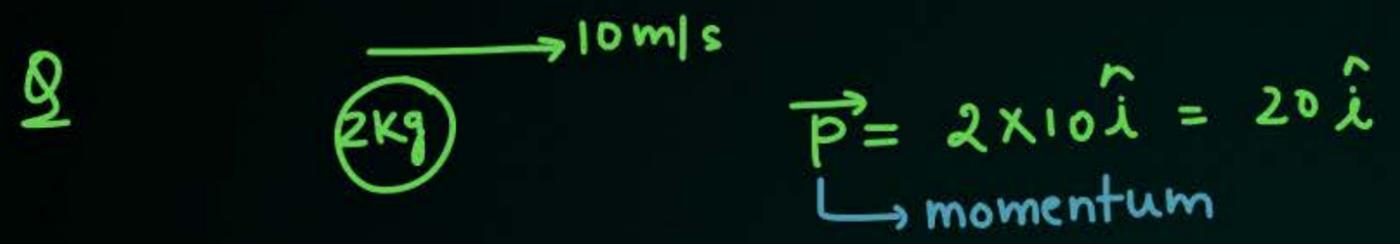
- mass is the measurement of inertia

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Momentum → $\vec{p} = m\vec{v}$
 (particle)

$$\left\{ \begin{array}{l} \vec{p}_{\text{body}} = M_{\text{body}} \vec{v}_{\text{com of body}} \\ \vec{p}_{\text{system}} = M_{\text{system}} \vec{v}_{\text{com of system}} \end{array} \right\} \equiv \text{Com of } \checkmark$$



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Force → push or pull.

Types of force

Very imp
**

- ① Gravitational force → $mg, \frac{Gm_1m_2}{r^2}$
 - ② Electromagnetic force → T, N, f, \dots
 - ③ Strong nuclear force
 - ④ Weak nuclear force
- } 11^{th}
- } 12^{th} (modern)

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Newton 1st Law → A body continue to be in state of rest or in state of uniform velocity (st. line) until or unless net external force acts on it.

- Law of inertia.

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Newton Second Law

~~F = ma~~

If $m \rightarrow \text{const}$
 $(\vec{F}_{\text{net}})_{\text{ext}} = m\vec{a}$

$$(\vec{F}_{\text{net}})_{\text{ext}} = \frac{d\vec{p}}{dt} \quad \vec{p} = m\vec{u}$$

$$(\vec{F}_{\text{net}})_{\text{ext}} = \frac{d(m\vec{u})}{dt} = m \frac{d\vec{u}}{dt} + \vec{u} \frac{dm}{dt}$$

If $m \rightarrow \text{const} \Rightarrow \frac{dm}{dt} = 0$

$$(\vec{F}_{\text{net}})_{\text{ext}} = m \frac{d\vec{u}}{dt} = m\vec{a}$$

rocket prop. \equiv ~~F = ma~~
variable mass system \Rightarrow $F = ma$

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Newton third Law

- For every action there is equal & opposite reaction.
- at the same time, simultaneously
- Same nature, same magnitude
- two diff. body event
- Action reaction pair.

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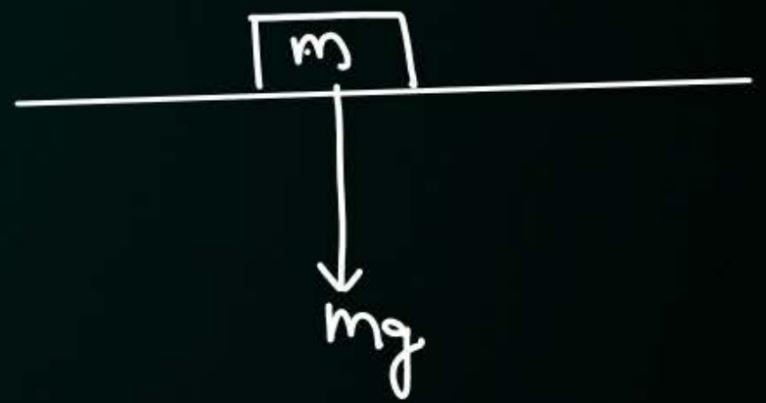
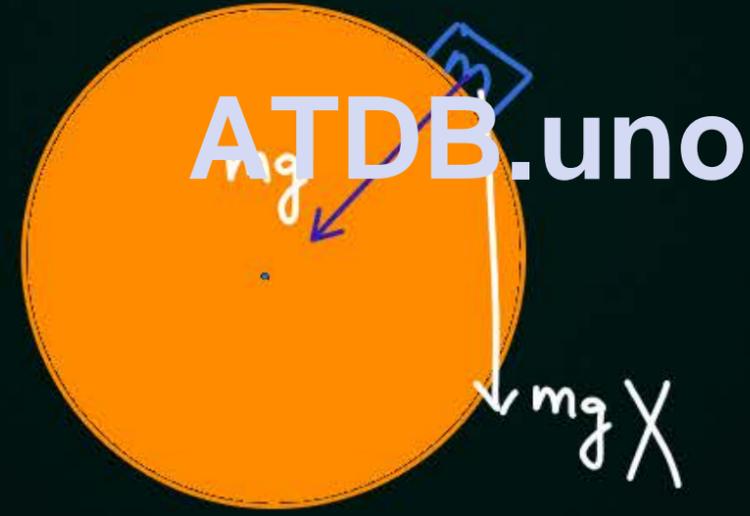
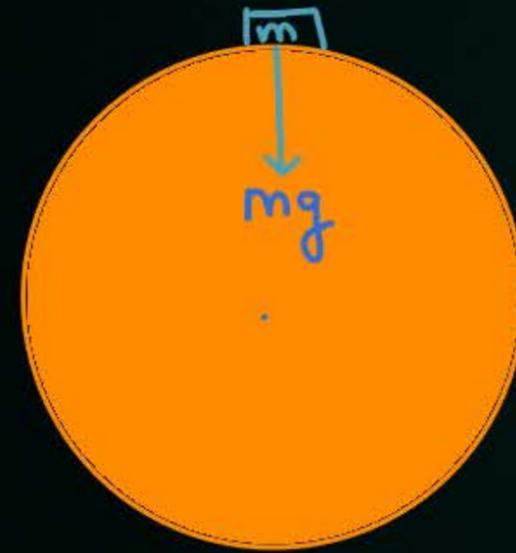
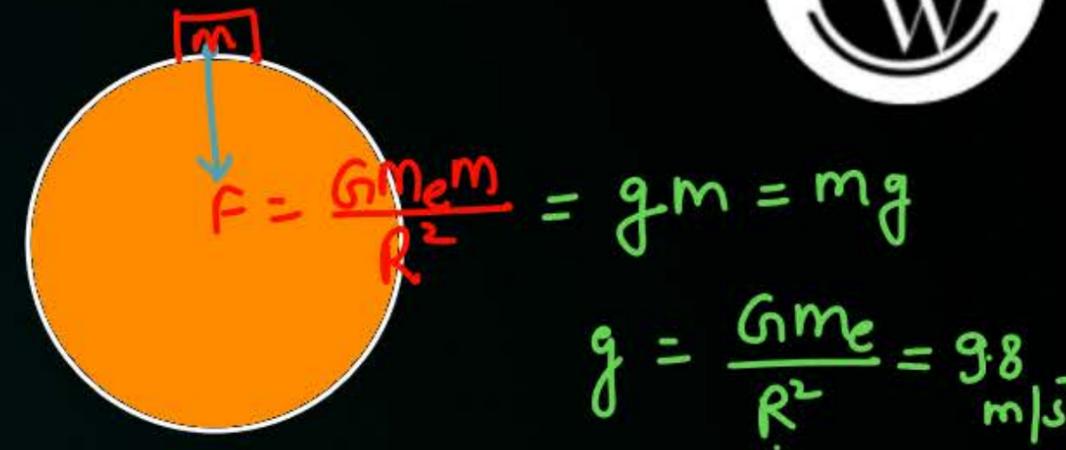
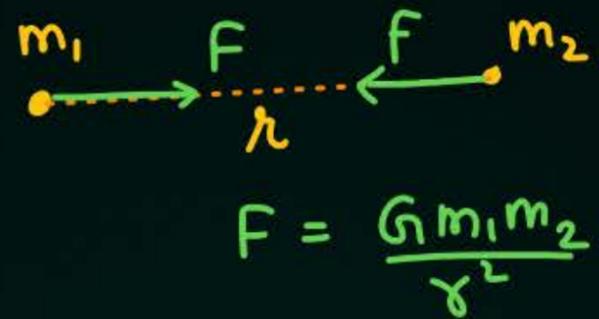
अगर A ने B पर force लगाया F तो B भी वापस A पर force लगाएगी 'F'

{ same nature
" magnitude
" direction
dir" opposite }

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Gravitational force

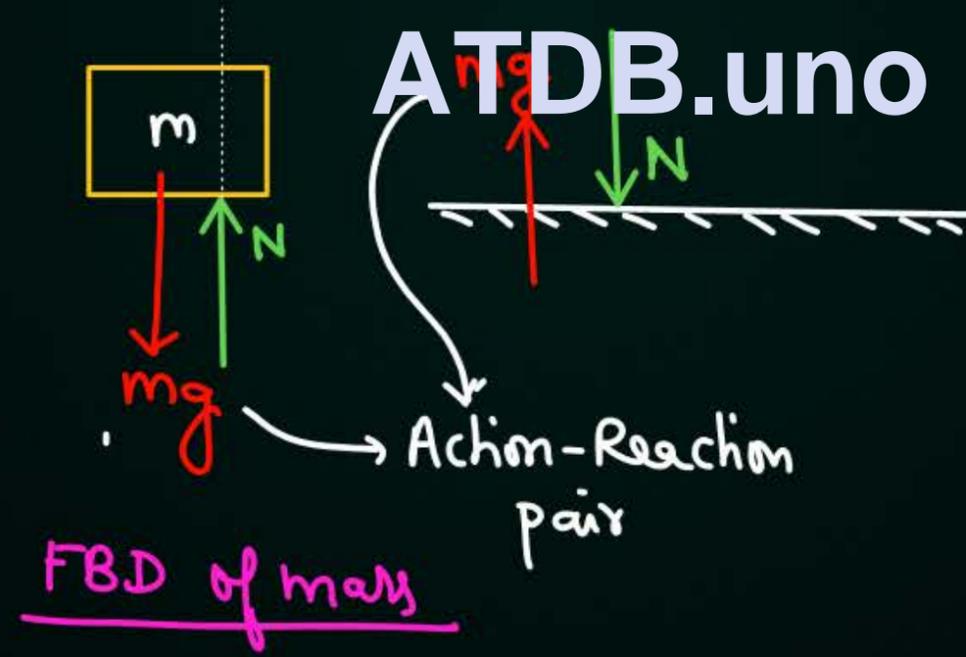
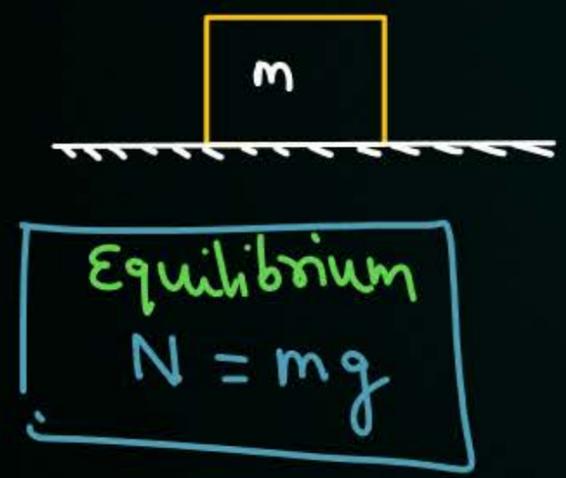




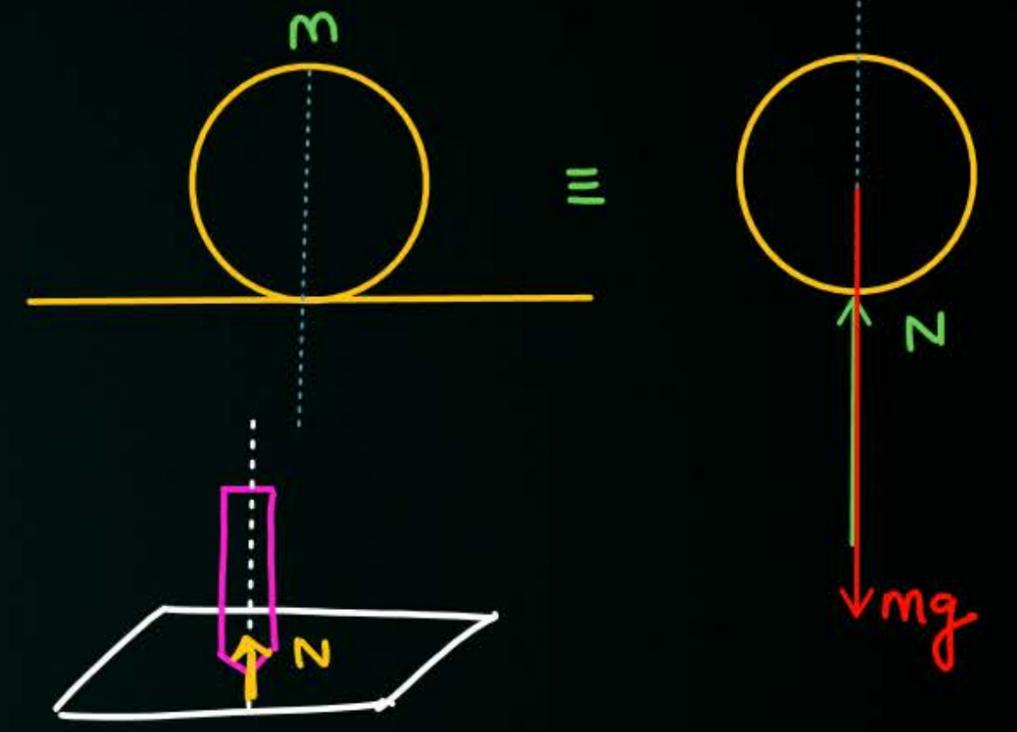
② Normal force

- Towards the body. (perpendicular to flat surface)
- pushing nature.

① If both surface are flat



② If one surface is flat

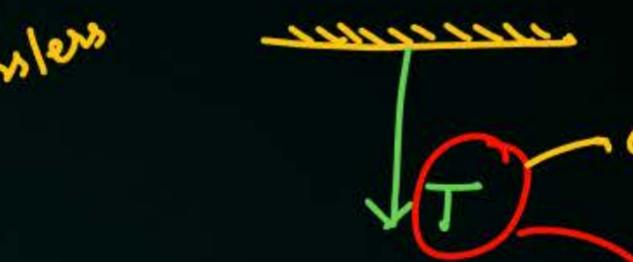


③ If both surface का ऊपर-खाल, चोच दिमाग मत लगाता $N_x N_y$ मान लेता



Tension force

- Pulling nature
- Act away from the body along the string



$F_{net} = 0$
 $T = mg$

only T दिवाया.
~~Are Action Reaction pair~~

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~~T & mg are action Reaction pair~~



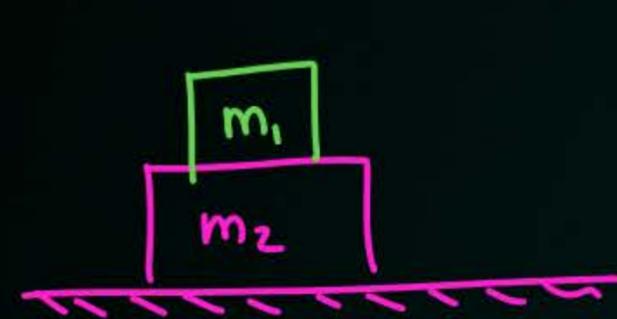


जिसकी FBD बना रहे हैं उस पर लगने वाले सारे forces दिखाते हैं

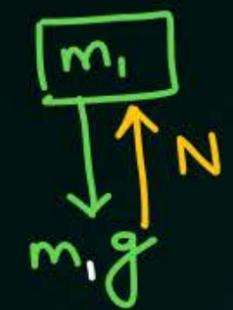
Q Draw **FBD** of given masses.

If Both masses are considered as system

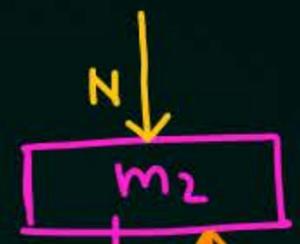
①



Equilibrium



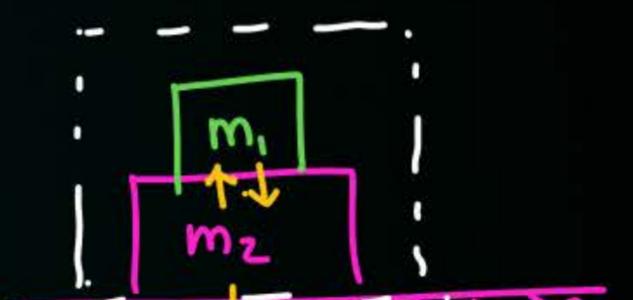
$$N = m_1g$$



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$$N_{\text{जमीन}} = m_2g + N$$

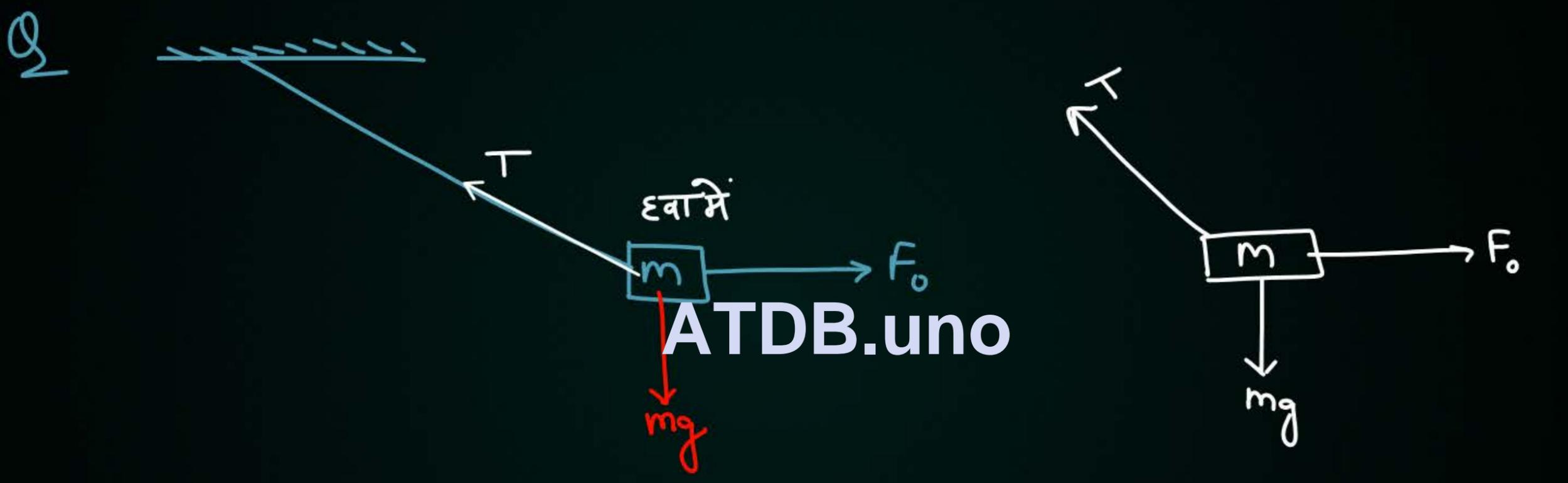
solve $N_{\text{जमीन}} = m_2g + m_1g$



$N_{\text{जमीन}}$

$$(m_1 + m_2)g$$

$$N_{\text{जमीन}} = (m_1 + m_2)g$$





Home work

- Complete Kinematics H.w & solve ques.

- module H.w motion in a plane

Tuesday (21 May) \Rightarrow Aarambh ^{All} solved example (page 130) (1-18)

Wednesday \Rightarrow Prarambh \Rightarrow (52-74)

Thursday Prarambh \Rightarrow (75-94)

Friday \Rightarrow Prabhal \Rightarrow (1-30)

(Saturday-Sunday) Parikshit JA level \Rightarrow 1, 3, 6, 8, (15-18), (19-25)



THANK YOU

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