PRAYAS

JEE 2025

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Lecture- 02

Physics

Laws Of Motion

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Topics *to be covered*

1. FBD
2.
3.
4.

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

$$\Delta\vec{p} = \int d\vec{p} = \int \vec{F}\,dt = \text{Area}$$

momentum

$$p = 3t^2 + 4t$$

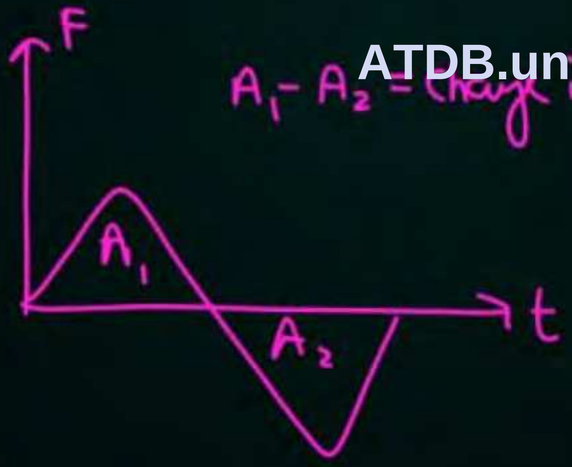
find net force, acc at $t = 2$ sec $(m = 2kg)$

$$F = \frac{dp}{dt} = 6t + 4$$

$t = 2$

$F = 16N$

$a = \frac{F}{m} = 8$



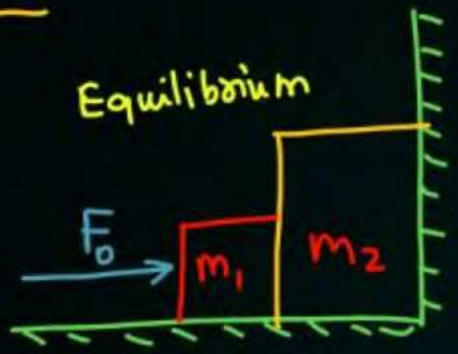
$A_1 - A_2 =$ change in momentum

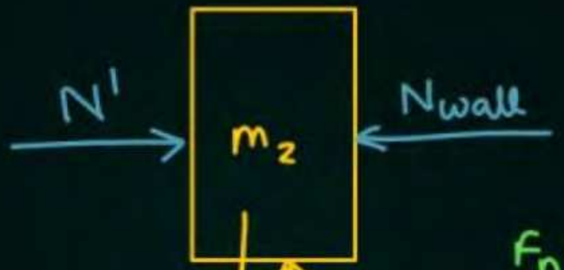
Draw

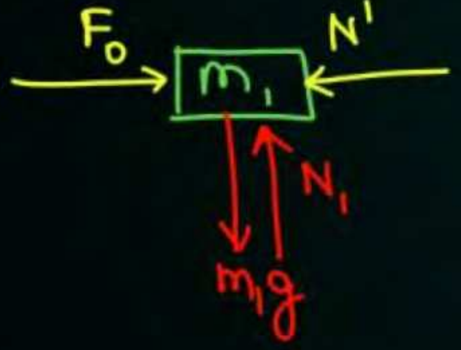
FBD

(1)

Equilibrium







m_2g

$N_1 = m_1g$

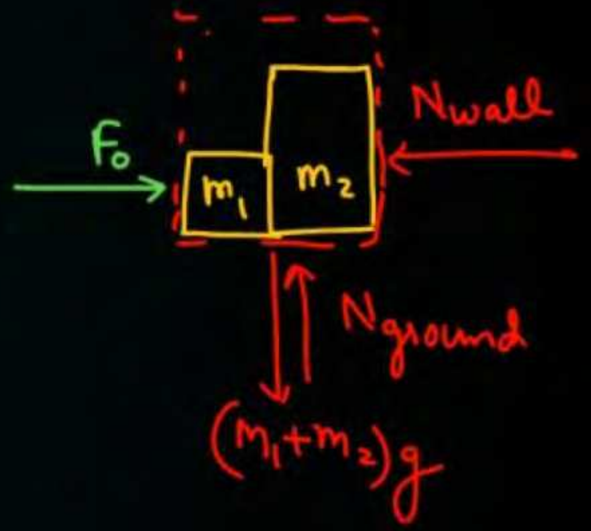
$F_0 = N'$

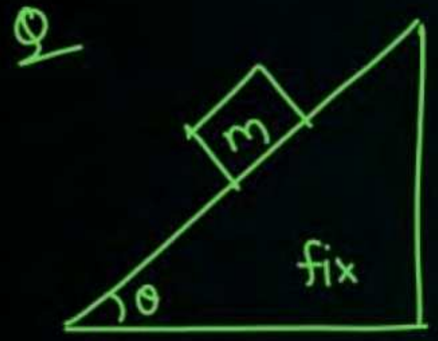
$F_{net} = 0$

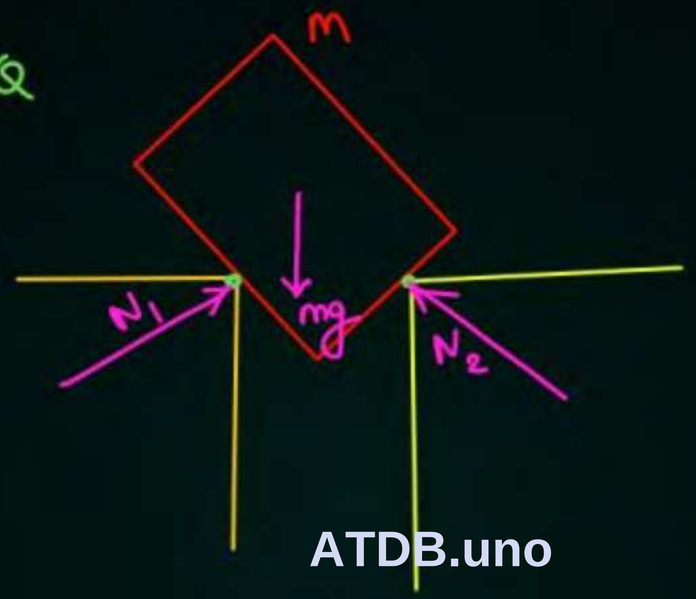
$N' = N_{wall}$

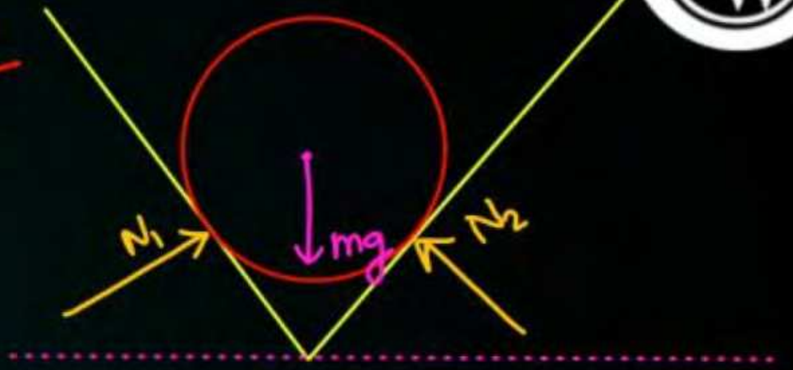
$N_2 = m_2g$

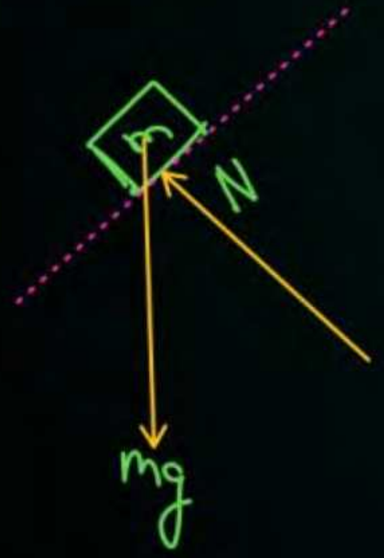
FBD of (m_1+m_2)

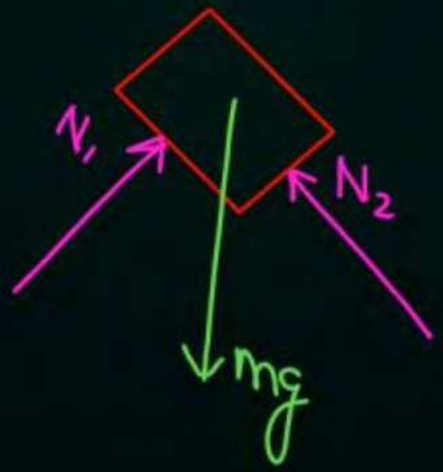


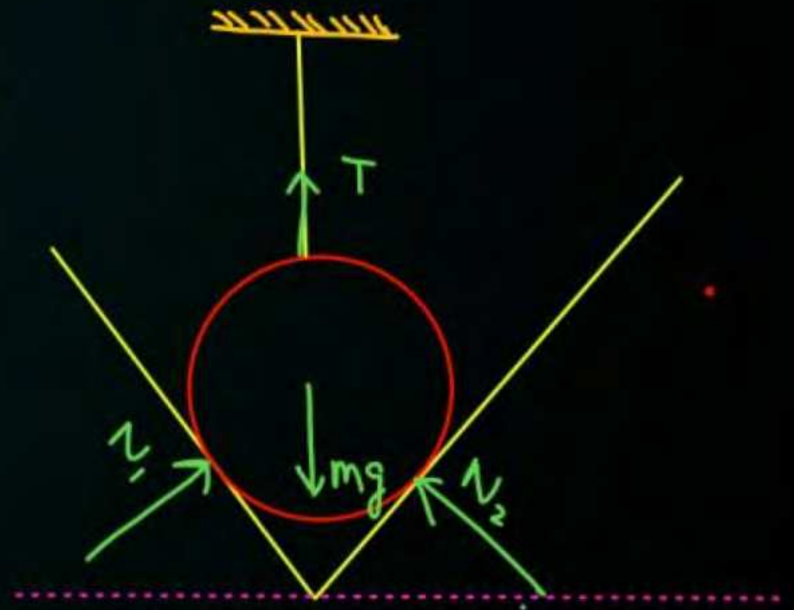




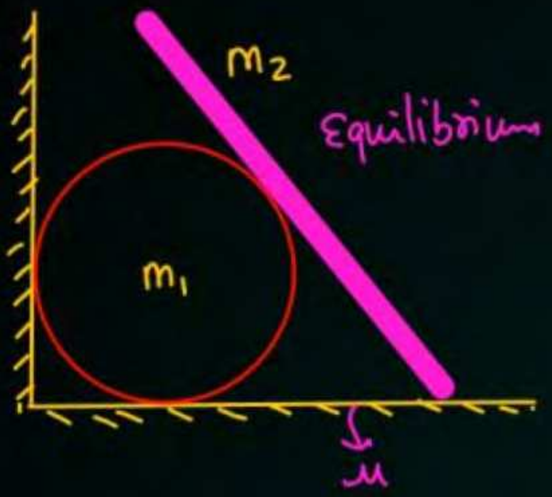


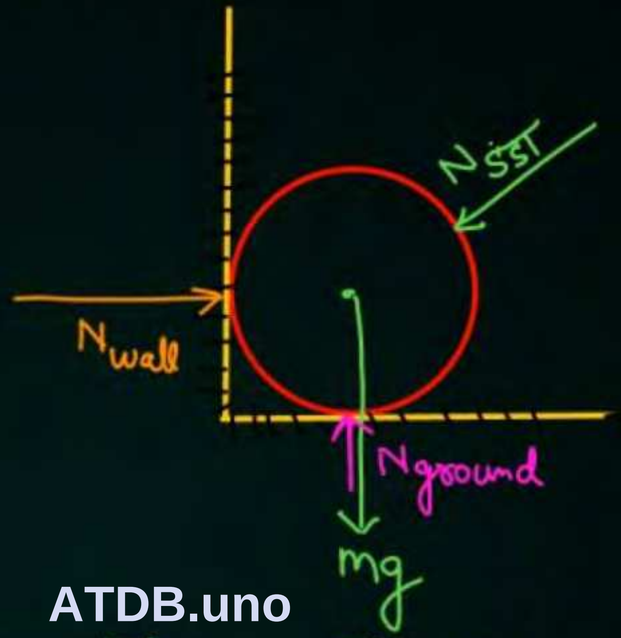


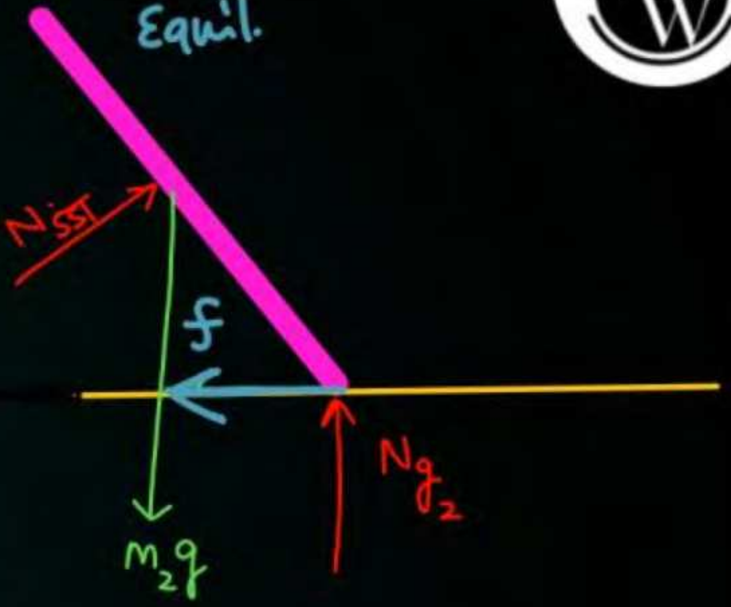




Q



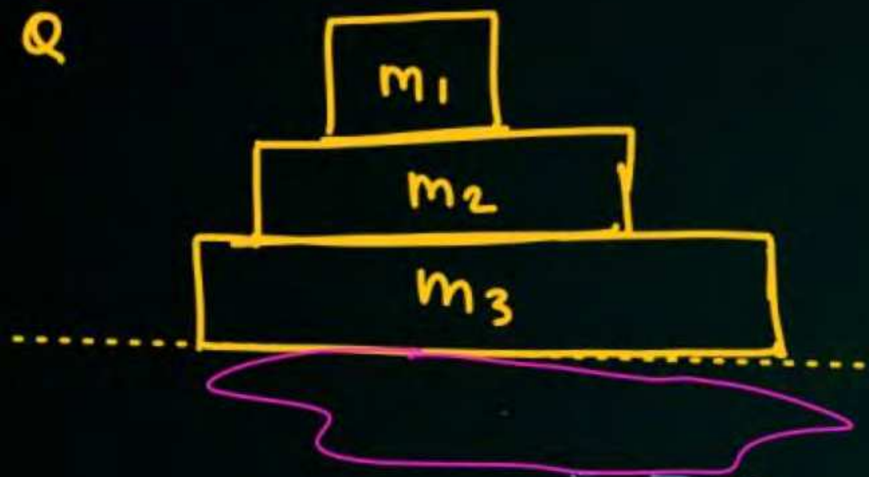


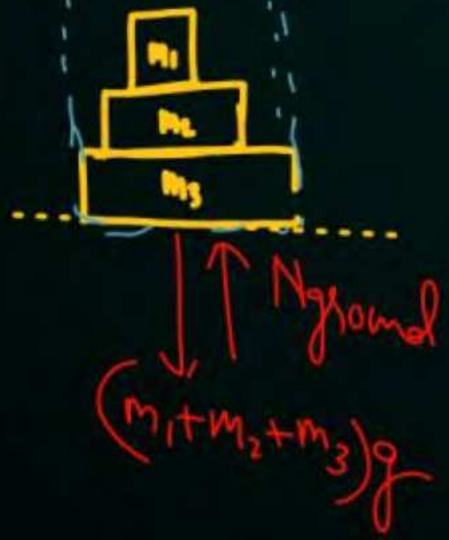


$$\vec{N}_{wall} + \vec{N}_{ground} + \vec{F}_{mg} + \vec{N}_{self} = 0$$

(Equilibrium)

Q

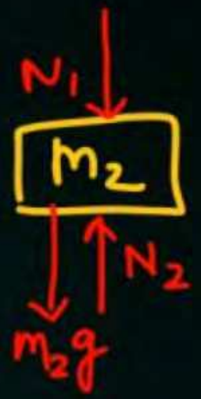


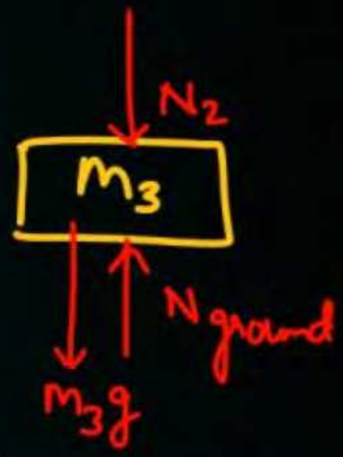


$N_1 = m_1 g$

$N_2 = N_1 + m_2 g$

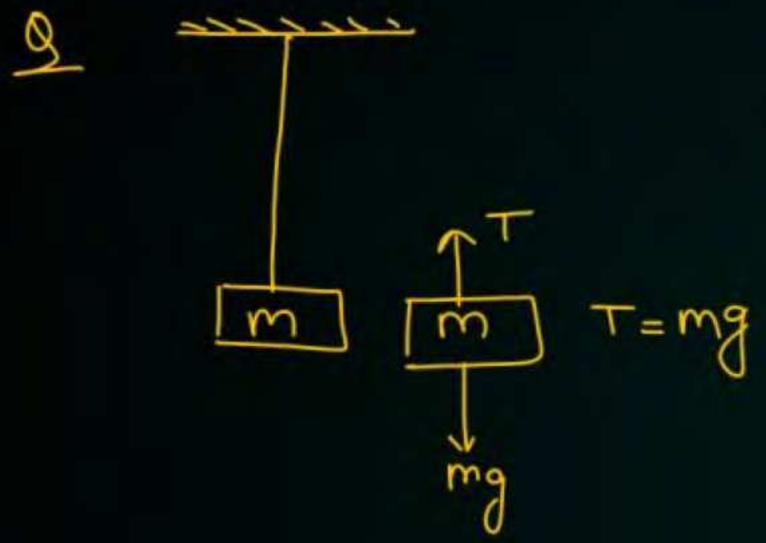
$N_2 = m_1 g + m_2 g$

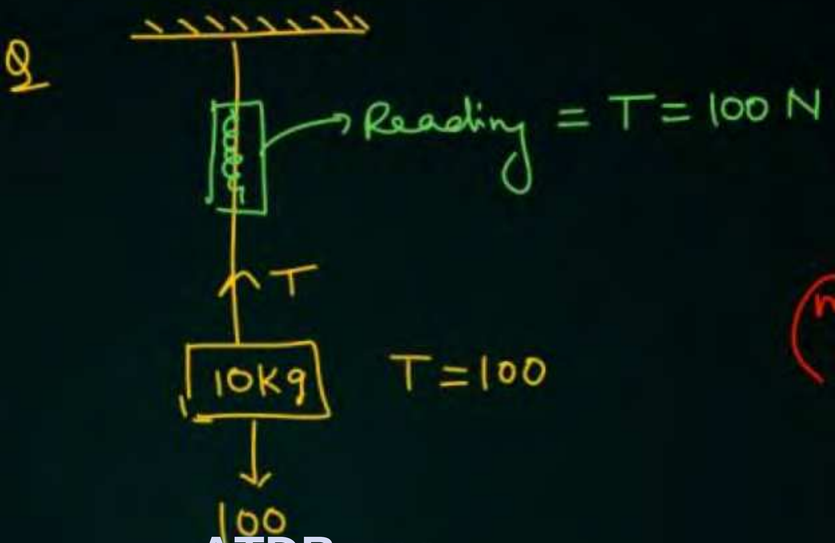


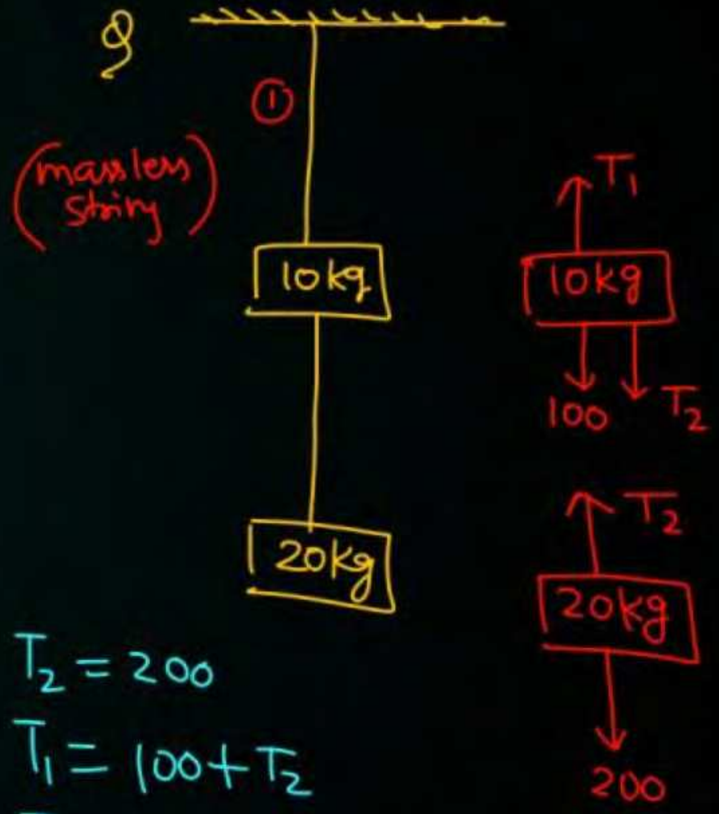


$N_{ground} = N_2 + m_3 g$

$N_{ground} = m_1 g + m_2 g + m_3 g$



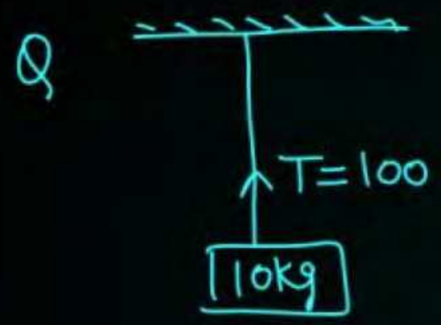


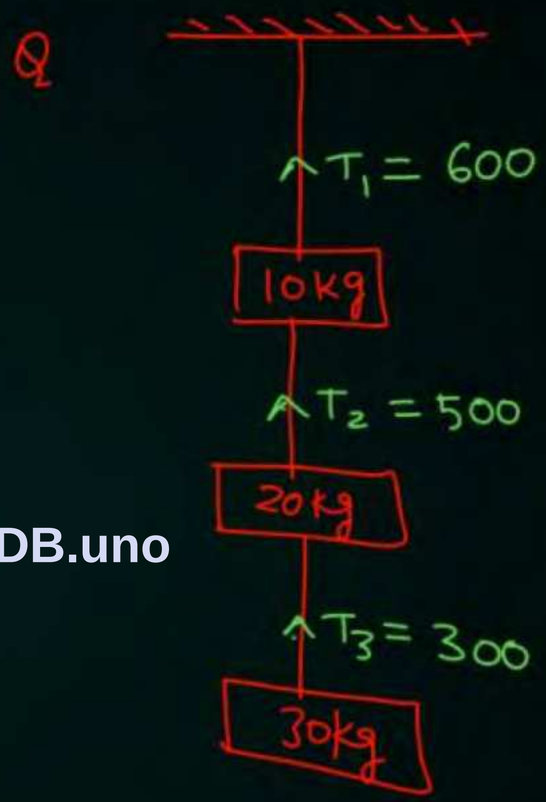


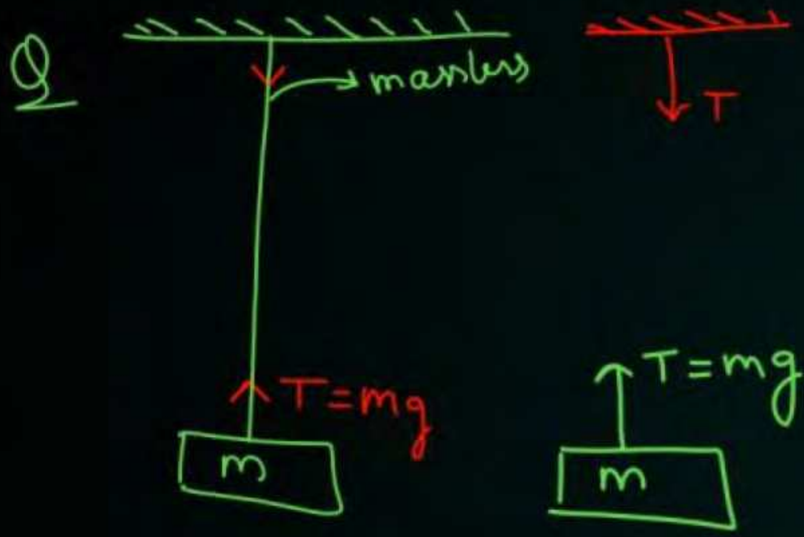
$T_2 = 200$

$T_1 = 100 + T_2$

$T_1 = 100 + 200 = 300$







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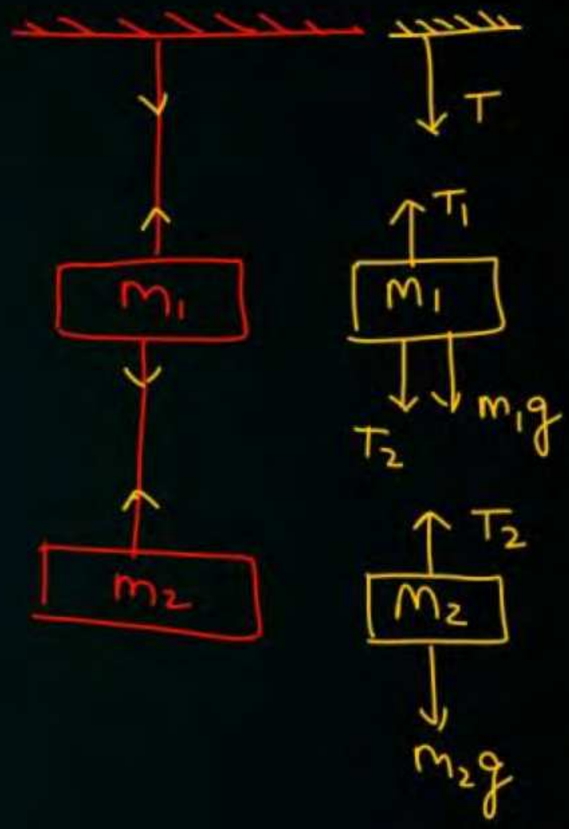


Which of the statement are correct

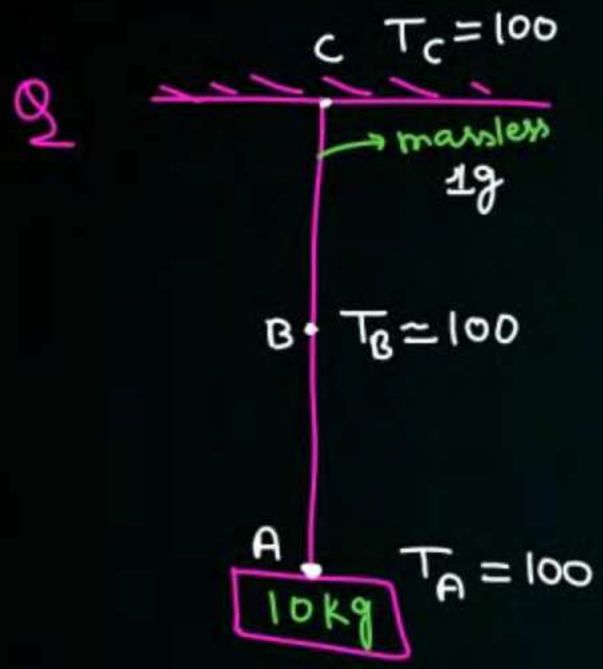
(1) massless रस्सी में Tension हमेशा Same होती है — 84% → wrong

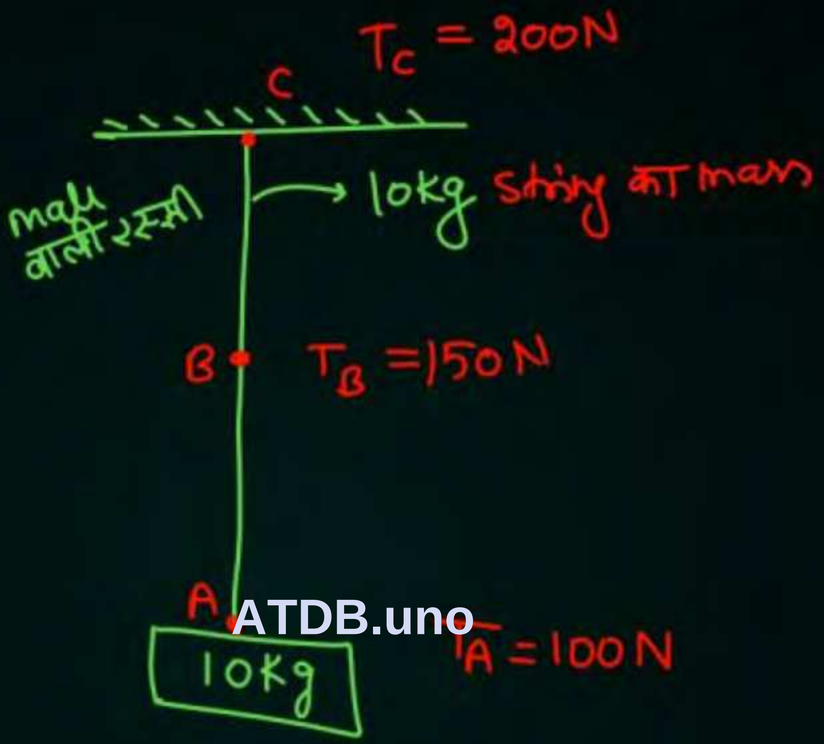
(2) " " " " अलग " " — 20% → wrong

(3) mass वाली " " " अलग होती है — 75% → wrong

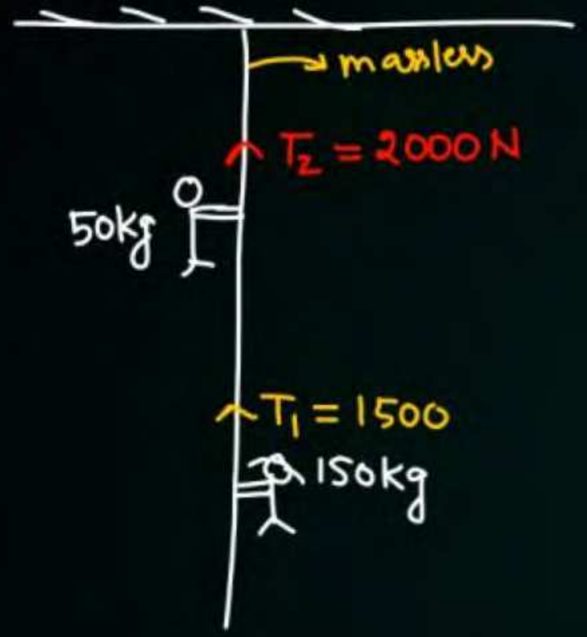
(4) " " " " Same होती है — 20% → wrong

→ ऐसा कोई Rule नहीं है, कुछ भी हो सकता है





Q



Q (mass m, L) Rest

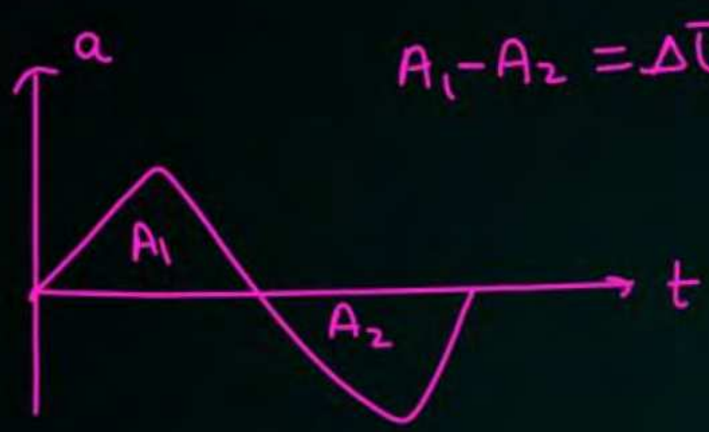
$F_{net} = 0$

$F = T$

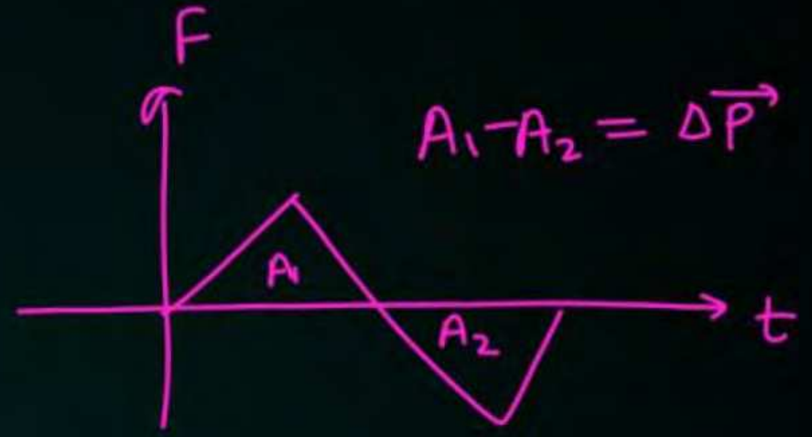
$T' = T = F$

$T' = T'' = F$

tension at every point = F



$A_1 - A_2 = \Delta \vec{v}$



$A_1 - A_2 = \Delta \vec{p}$

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Home work

- Solve Kinematics HW given to you
- Complete your backlog if you have.

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