

LAW 1

INERTIA

LAW 2

$F = ma$

mg

action

reaction

LAW 3

ACTION-REACTION

CLASS – 11

PHYSICS

Chapter – 4

Laws of Motion

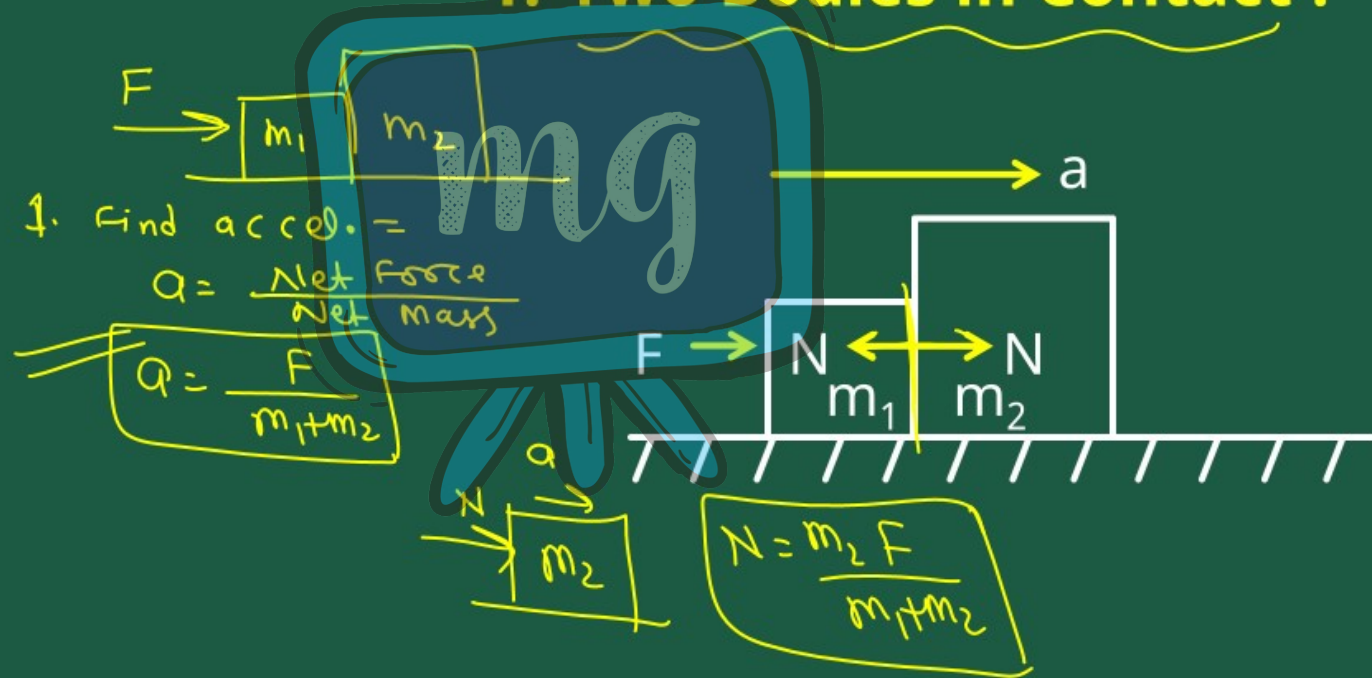
Part – 9

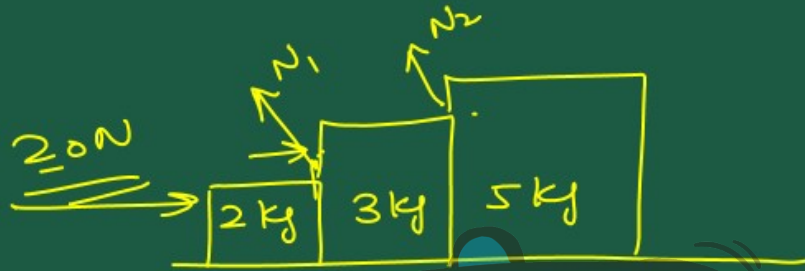
Motion of Connected Bodies

Alok Gaur

Motion of Bodies in Contact

1. Two Bodies in Contact :





$$a = \frac{20}{2+3+5} = \frac{20}{10} = 2 \text{ m/s}^2$$

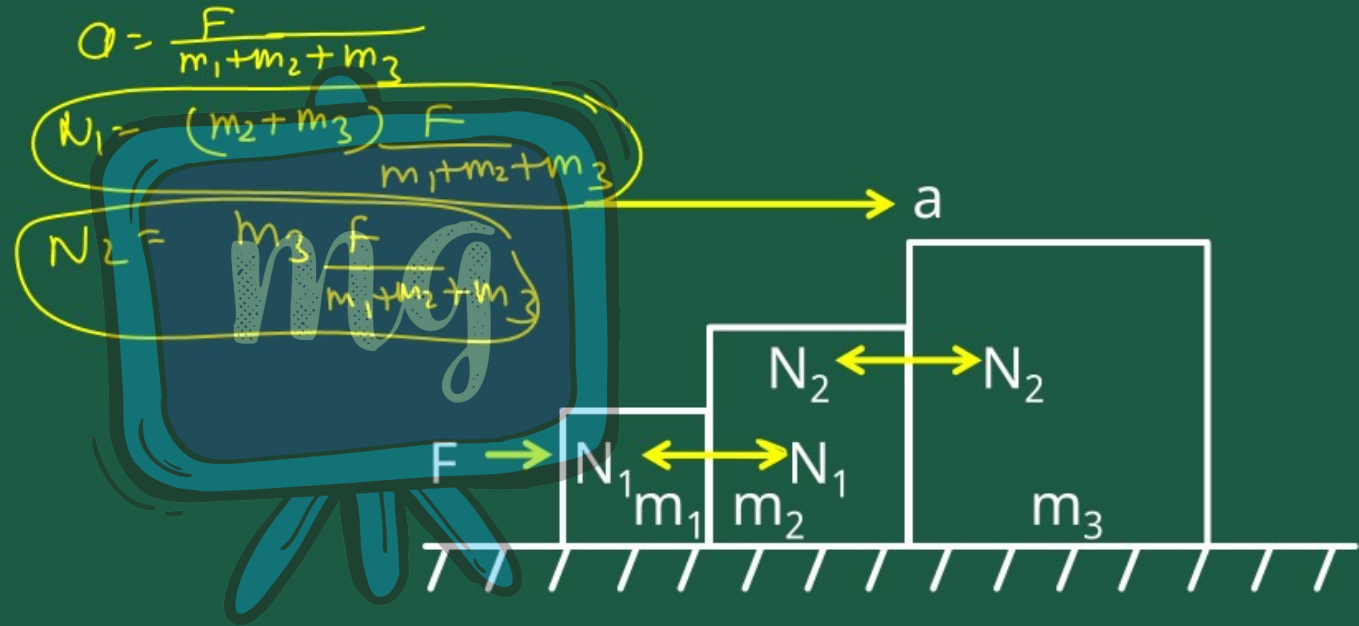


$$N_1 = 8 \times 2 = 16 \text{ N}$$

A free-body diagram of the top block (5kg). A horizontal arrow labeled N_2 points to the left side of the block. A vertical arrow labeled '5' points downwards from the center of the block, representing its weight.

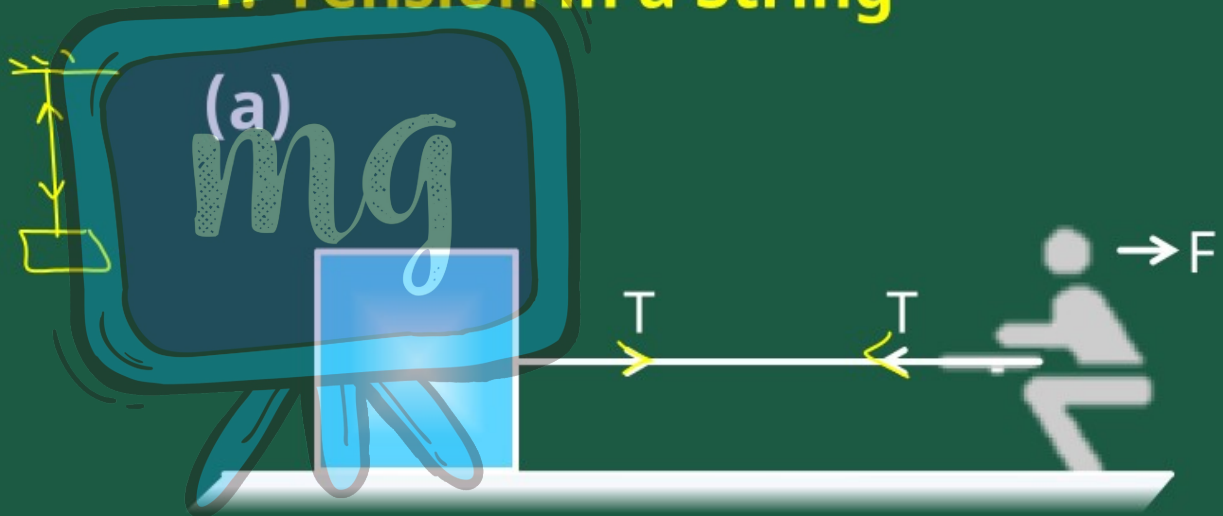
$$N_2 = 5 \times 2 = 10 \text{ N}$$

2. Three Bodies in Contact :

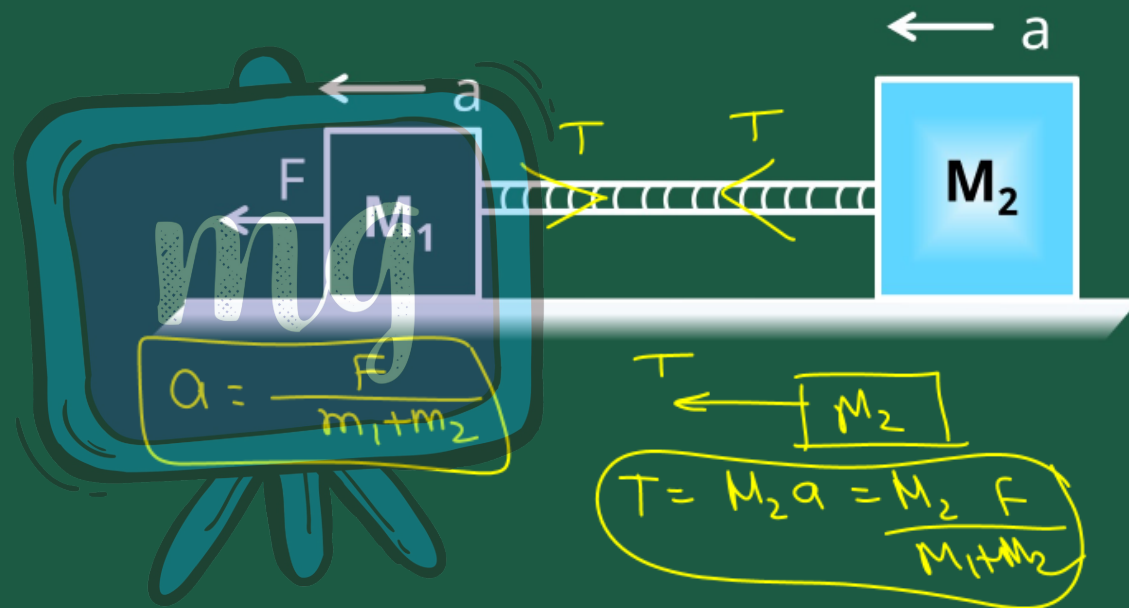


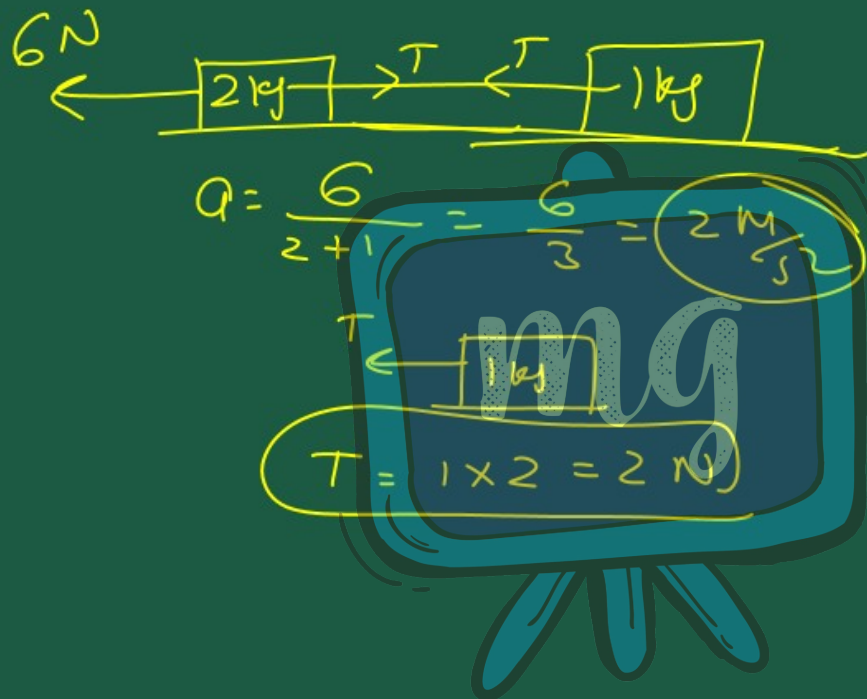
System of Masses Tied by Strings

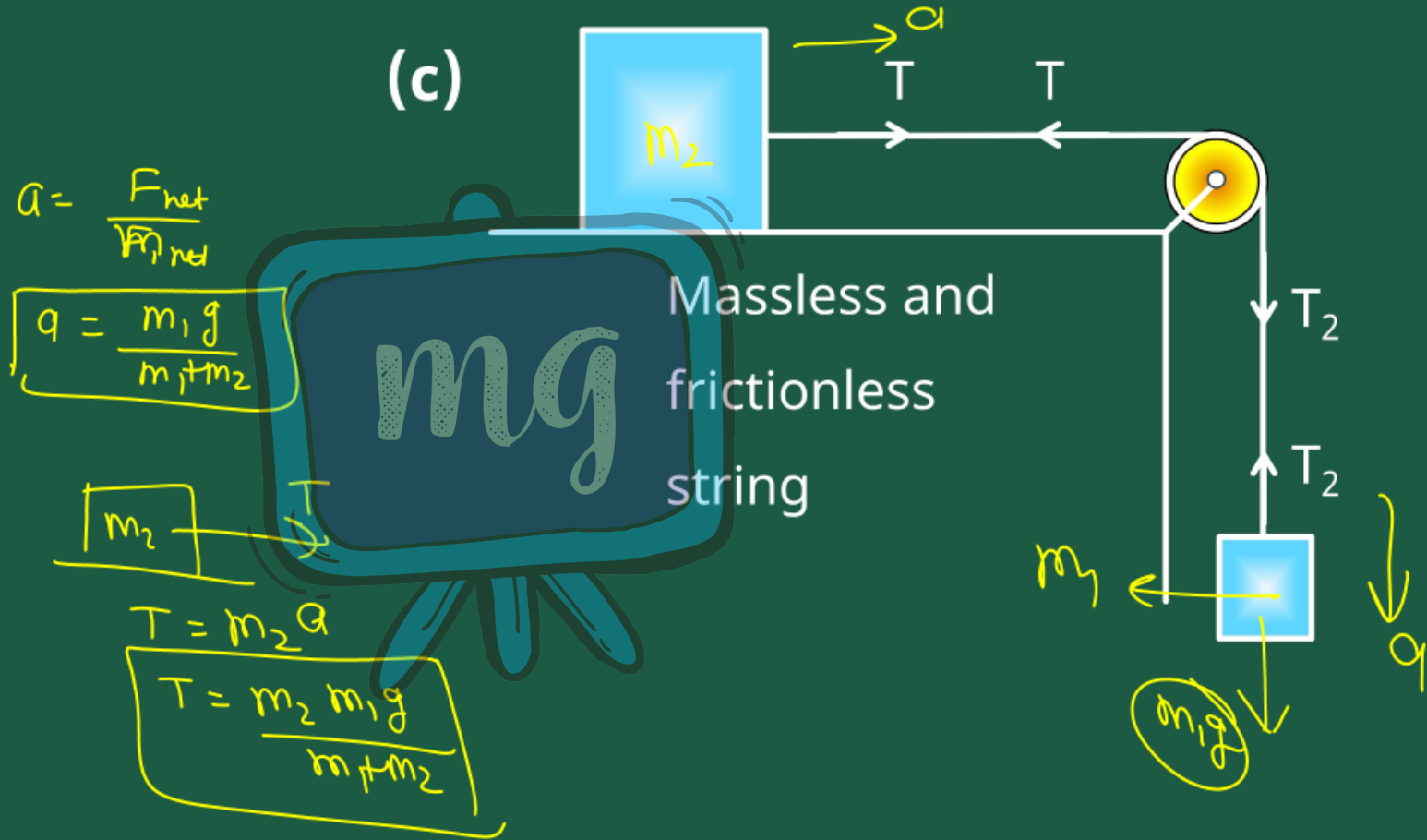
1. Tension in a String

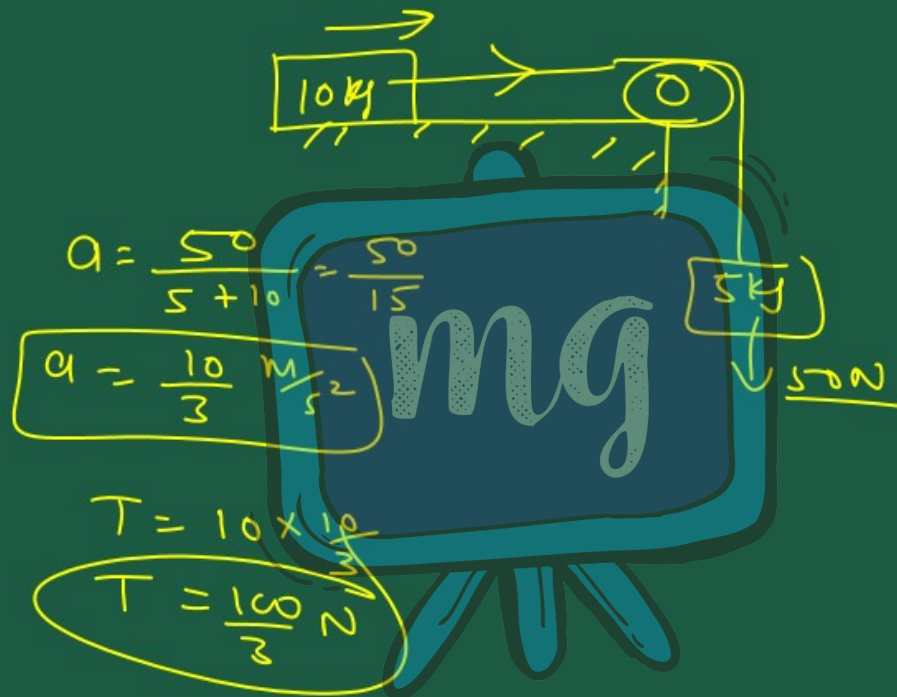


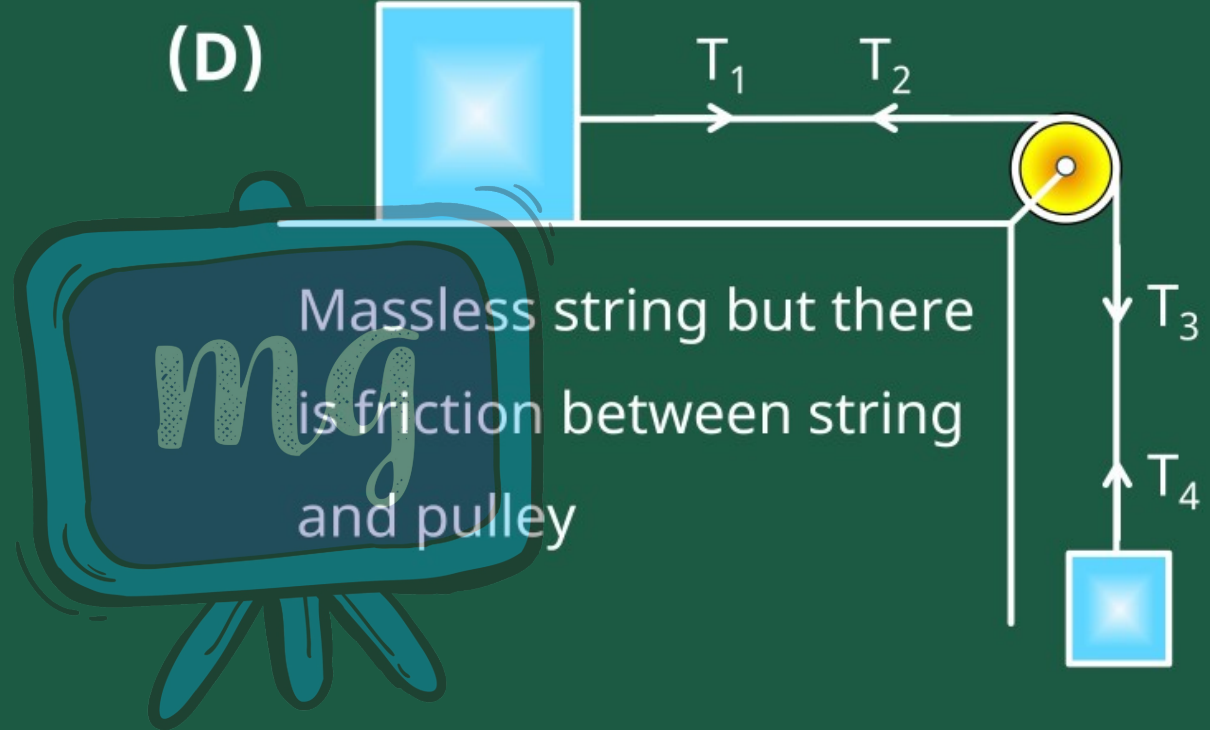
(b)



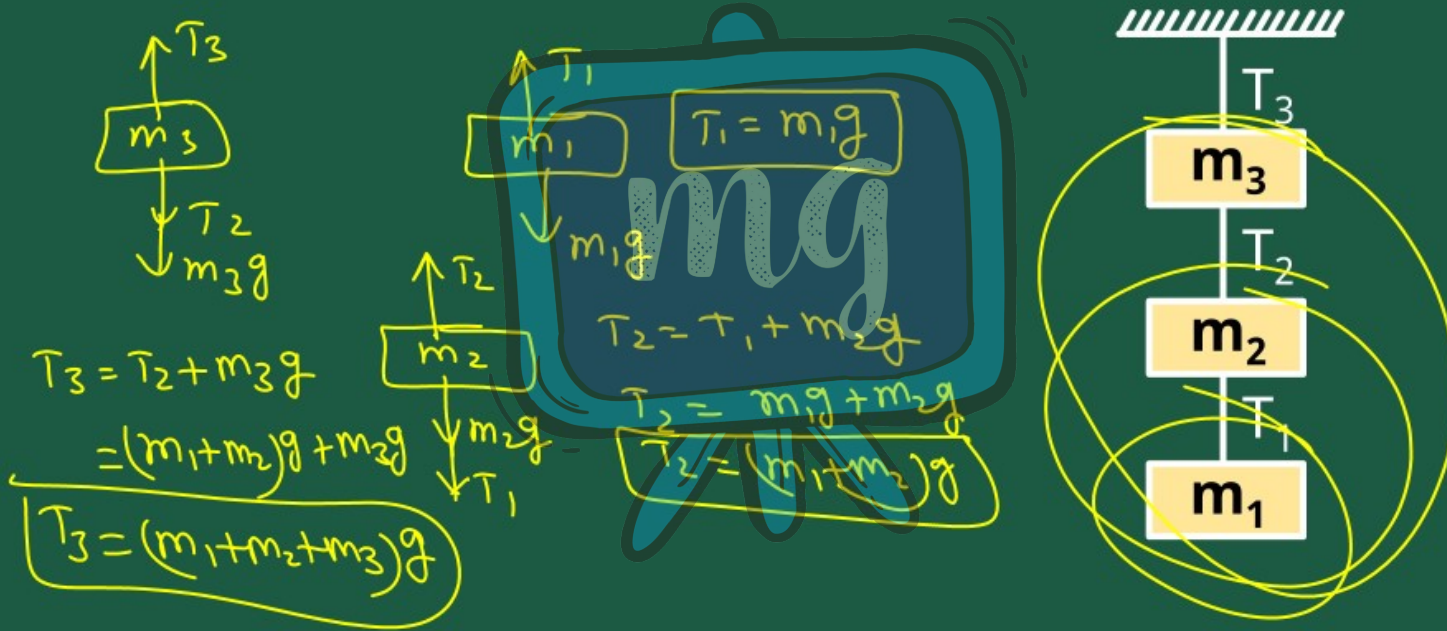






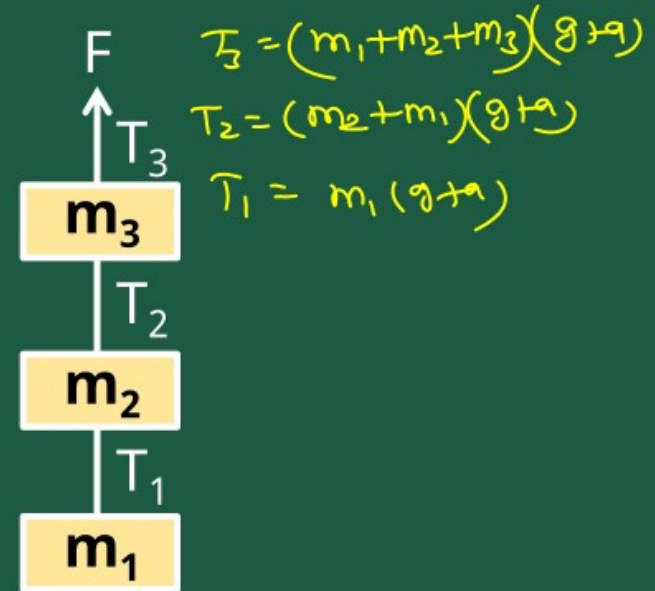
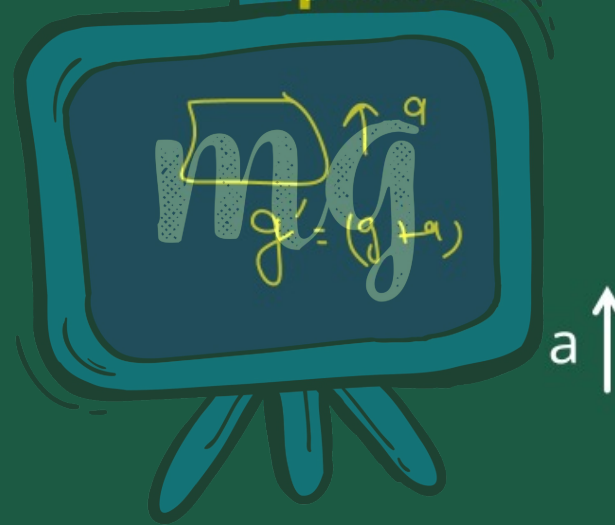


2. Bodies Hanging Vertically



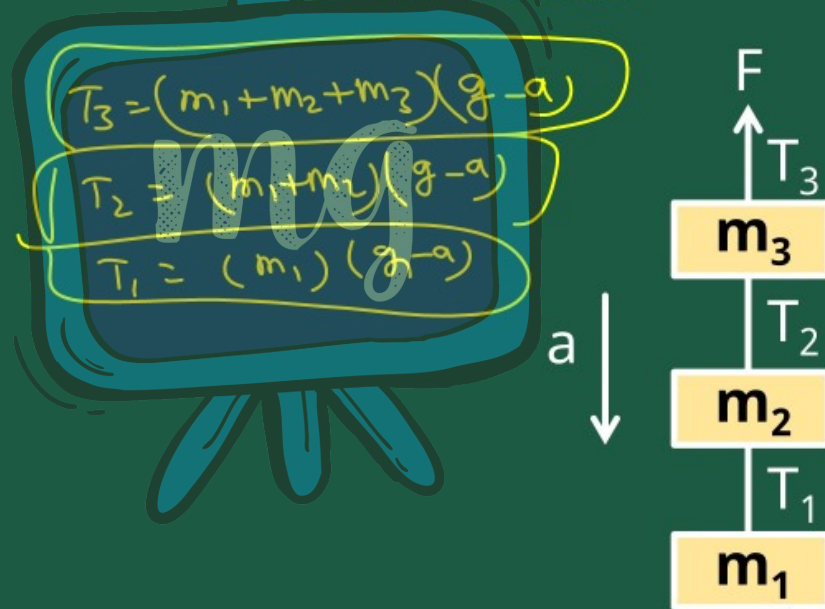
3. Bodies Accelerating Vertically

Upwards



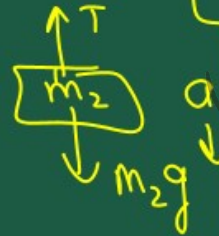
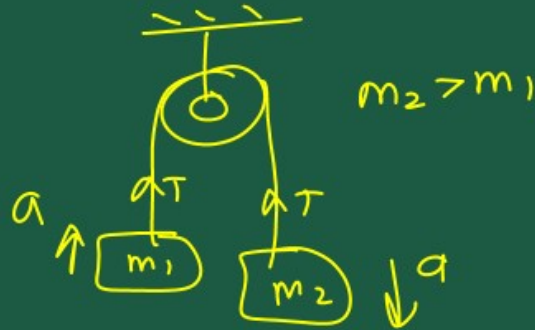
4. Bodies Accelerating Vertically

Downwards



Pulley Systems

Some Cases of Pulley



(a)

$$m_2g - T = m_2a \quad \text{--- (1)}$$

$$T - m_1g = m_1a \quad \text{--- (2)}$$

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

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

