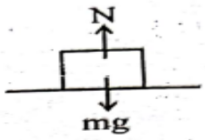
CH 3 MOTION & FORCE Pt 3

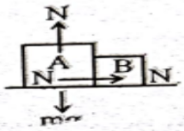
NORMAL CONTACT FORCE.

→ Force Perpendicular or Parallel to Surface of Contact.

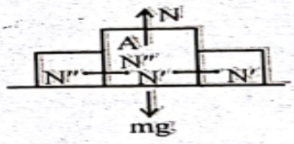
① Single Normal contact force
b/c 1 Contact surface.



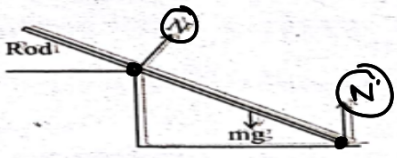
② Two Normal Contact forces
b/c 2 Contact Surfaces.



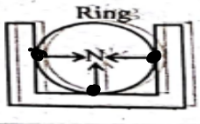
③ Three Normal Contact forces
b/c 3 contact Surfaces.



④ Two Normal Contact forces
b/c 2 Contact points.

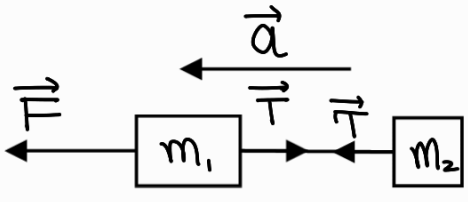


⑤ Three N.C forces
b/c 3 Contact points.



⑥ No N.C force
b/c No contact.

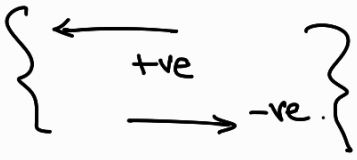
Masses In Contact via String.



Application of Newton's laws

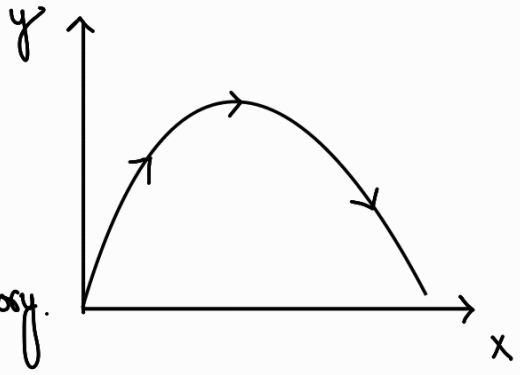
$\Rightarrow \quad \vec{F} - \vec{T} = m_1\vec{a}$ for m_1.

$T = m_2\vec{a}$ for m_2.



$$T = \frac{m_2 F}{m_1 + m_2} \quad \& \quad a = \frac{F}{m_1 + m_2}$$

PROJECTILE MOTION.



→ Trajectories.

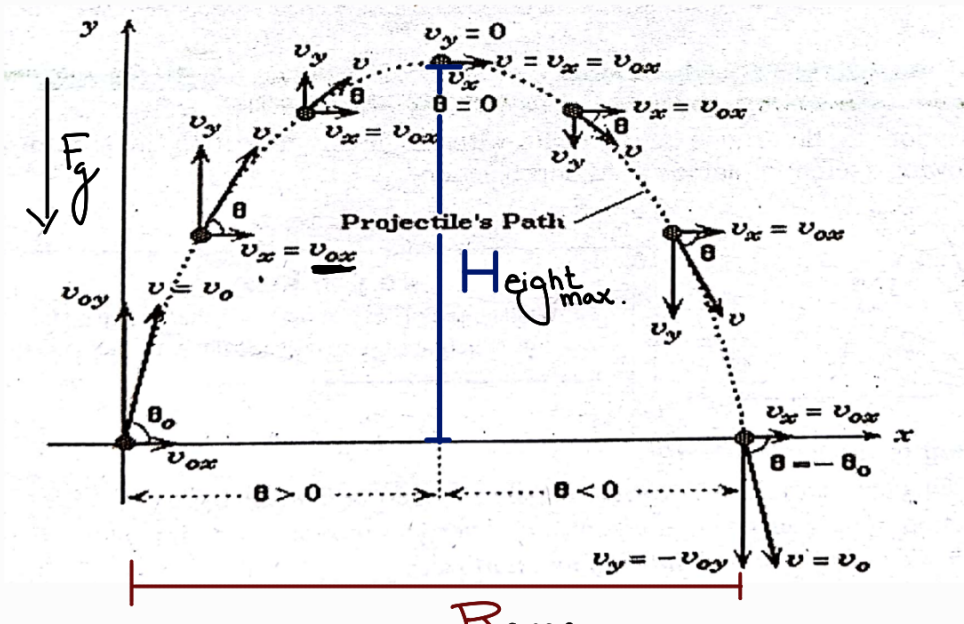
Assumptions:

1) Earth is estimated to be flat over trajectory.
2) Accel. due to gravity is const. " "
3) Instant. velocity is max at start and end.
4) " " " min at max height.

$a_x = 0$

$a_y = -g$

Horizont & Vert. Comp.



$$X = v_x \times t.$$

$$X = V_o \cos\theta_o \times t.$$

$$y = V_o \sin\theta_o t - \tfrac{1}{2} g t^2$$

Time to reach max height:

$$a = \frac{v}{t} \Rightarrow a_y = \frac{v_y}{t} = \mp \frac{V_o \sin\theta_o}{t} = \mp g$$

$$\boxed{t = \frac{V_o \sin\theta_o}{g}}$$

Range:

$$\boxed{R = \frac{V_o^2 \sin 2\theta_o}{g}}$$

Max R when?

when $\theta_o = 45°$

$$\boxed{R \tan\theta = 4H}$$

$R = H \Rightarrow \theta = 76°$