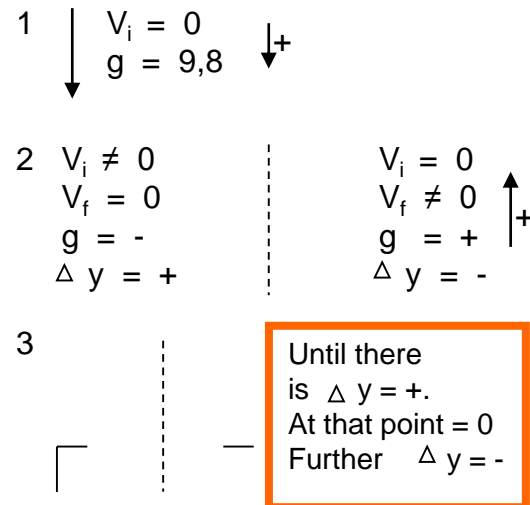


Definitions

- Freefall
is the unhindered movement of an object in the absence of air resistance where only gravitational force invades the object.
- Gravitation acceleration
is the acceleration experienced by a falling object due to the gravitational force of the earth on the object in the absence of air resistance.
- A projectile
is an object given an initial velocity by shooting, throwing or projecting it downwards and where the only force in action is only gravitational force.

3 Types of movement



Until there is $\Delta y = +$.
At that point = 0
Further $\Delta y = -$

Equations

1. $V_f = V_i + a \Delta t$
↳ final velocity $V_i = \text{start}$
2. $V_f^2 = V_i^2 + 2a \Delta y$
3. $\Delta y = V_i \Delta t + \frac{1}{2} a \Delta t^2$
4. $\Delta y = (V_f + V_i / 2) \Delta t$

Never use to get Δt unless $\Delta y = 0$ or $V_i = 0$

Displacement, vector shortest connection line of beginning point and end point

Vertical Projectile Movements

Frame of reference

- Frame of reference
is a set of reference points like an axis system that makes it possible to define the position of an object at any time.
- Relative velocity
Velocity of an object as measured in a specific frame of reference.

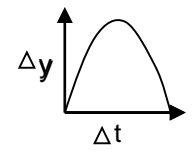
Example

$$\left. \begin{aligned} V_{MG}; V_{BG} \\ V_{MB} = V_{MG} + V_{GB} \end{aligned} \right\}$$

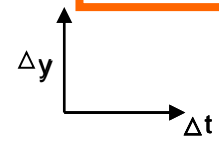
First comes m and then B, 2 at centres must be the same $\therefore g$.

Graphs

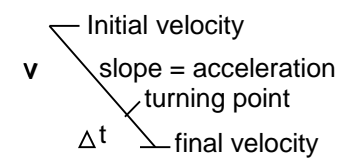
displacement-time



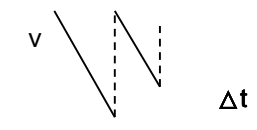
Bounce ball



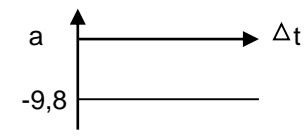
velocity-time



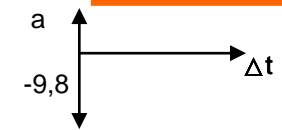
Bounce ball



acceleration-time



Bounce ball



Collisions

- Elastic
Total kinetic energy of the colliding object is maintained
- $E_k = \frac{1}{2} mv^2$
↳ scalar
↳ unit = Joule (J)
- Non-elastic
Total kinetic energy of the colliding object is not maintained