

MOTION IN A STRAIGHT LINE

Distance **Displacement**
 actual path length $\rightarrow$ shortest possible path length
 $\rightarrow$ scalar $\rightarrow$ vector
 $\{ \text{disp} < \text{distance} \}$

Speed **velocity**
 $\frac{\text{distance}}{\text{time}}$ $\frac{\text{displacement}}{\text{time}}$
 $\rightarrow$ scalar $\rightarrow$ vector
 $\frac{\Delta x}{\Delta t}$
 avg speed = $\frac{\text{distance}}{\text{time}}$ $\text{avg } v = \frac{\Delta x}{\Delta t}$

Acceleration
 $\vec{a} = \frac{\Delta \vec{v}}{\Delta t}$
 motion under gravity
 g (downward vector)

$v = \frac{dx}{dt}$
 $a = \frac{dv}{dt}$
 $a = \frac{d^2x}{dt^2}$
 $v_{\text{max}}: \frac{dv}{dt} = 0$

Equation of Motion:
 $v = u + at$
 $s = ut + \frac{1}{2}at^2$
 $v^2 = u^2 + 2as$

Stopping distance:
 $a \leftarrow \text{---} u \text{---} \rightarrow v=0$
 s
 $S = \frac{u^2}{2a}$

Motion under gravity:

same level, same speed only direction is different.

$$H_{\text{max}} = \frac{u^2}{2g}$$

Time of flight:

$$S=0$$

$$T = \frac{2u}{g}$$

Time:-

$$s = ut + \frac{1}{2}at^2$$

$$-h = 0 + \frac{1}{2}gt^2$$

$$t = \sqrt{\frac{2h}{g}}$$

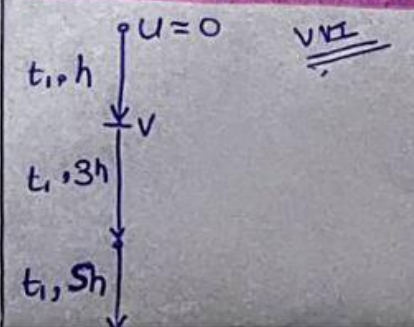
Final Velocity (v):

$$v^2 = u^2 + 2as$$

$$v = \sqrt{2gh}$$

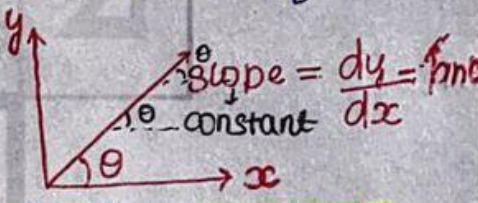
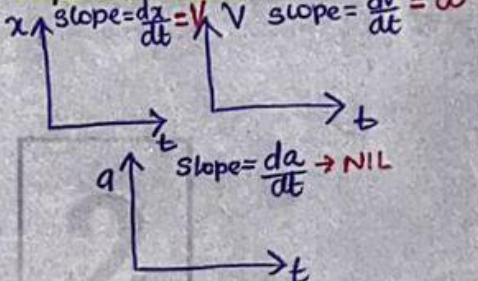
just before reaching the ground dropped from top.

Accelerated Particle:

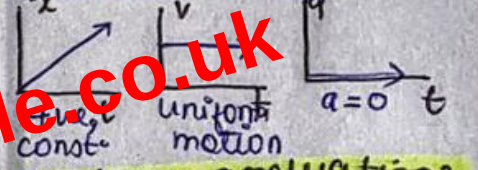


$$S_n = u + \frac{a}{2}(2n-1)$$

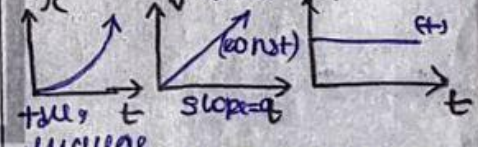
GRAPH THEORY:-



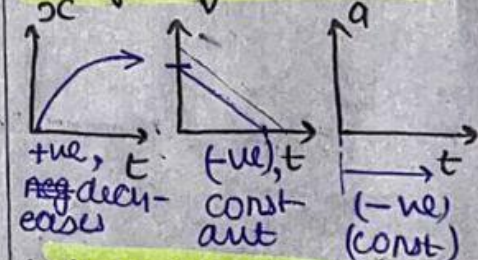
* Uniform motion:



* uniform acceleration:



* Uniform retardation:



* Area of a graph:

