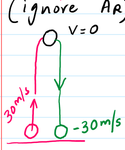
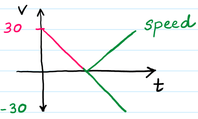
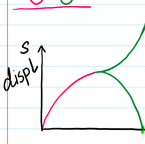
Graphs of v/t, s/t and a/t for an object moving under the influence of gravity.

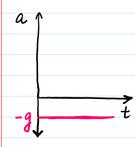
Q. An obj is projected vertically upwards with 30m/s. It reaches its max. height & returns back to ground. Taking the upward direction as positive construct the graphs (ignore AR).





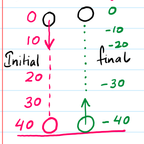


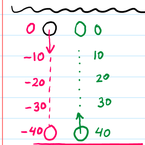
- grad = Speed/velo
"up" speed decreases
gradient decreases
"down" speed increases
grad increases



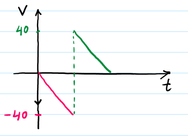
- acc is constant (graph straight Line).
- ↑ +ve since acc acts downwards ∴ acc must be negative.

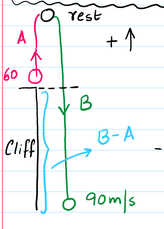
Q:- A ball is released from rest. It hits the ground with 40m/s & rebounds back to reach its starting pt. Taking ↓ direction as positive sketch the following graphs (ignore AR).

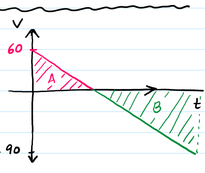




Take ↑ direction as positive.

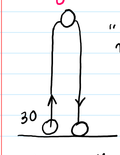




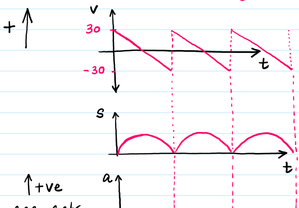


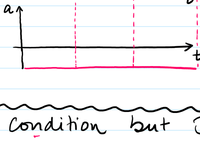
a = constant.
↑ +ve ; "a" acts down. ∴ "a" neg.

Graph (in case of multiple bounces)



" " multiple bounces.
collision is "Elastic"
Elastic ∴ No Loss of energy upon impact with the ground.

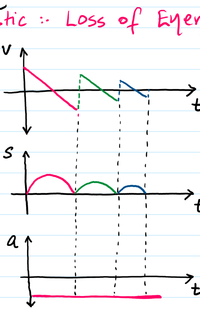




↑ +ve
acc acts down ∴ neg.

Same Condition but InElastic Collision

InElastic ∴ Loss of Energy upon Impact



Time interval b/w bounces keeps decreasing.