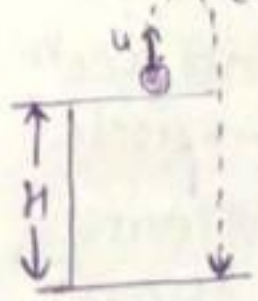
(19) Motion under gravity

(Height to ground)

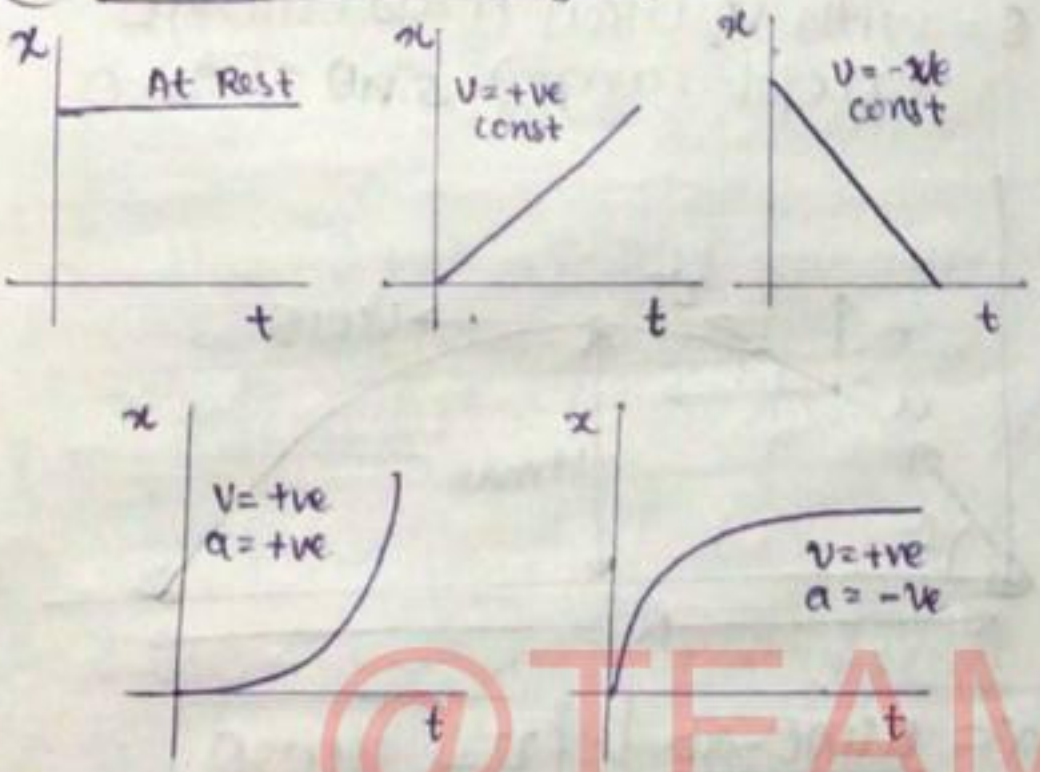


$$t = \frac{u}{g} + \sqrt{\frac{u^2}{g^2} + \frac{2H}{g}}$$

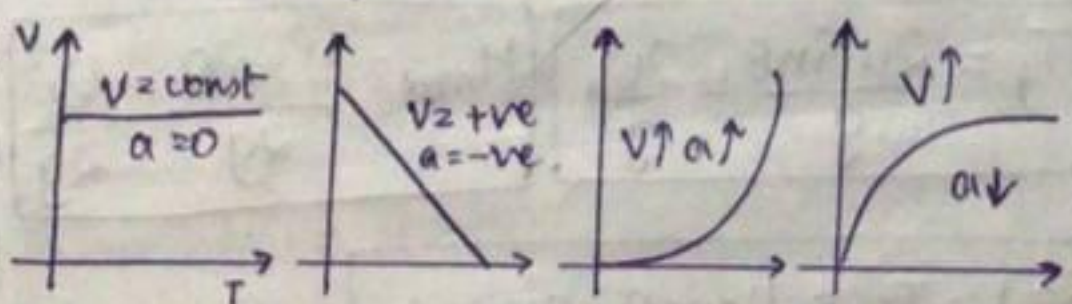
If $u = 0$ (dropcase) $\quad t = \sqrt{2H/g}$

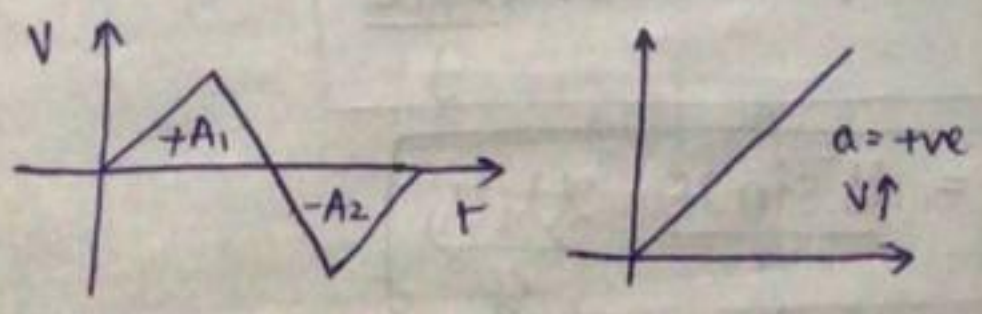
If $H = 0$ (G to G) $\quad t = \frac{2u}{g}$

(20) Position-time graph:

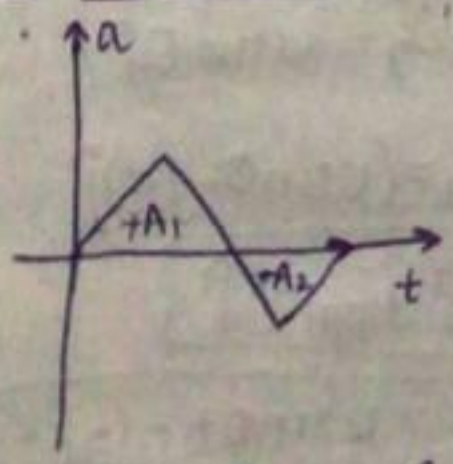


(21) Velocity-Time Graph:



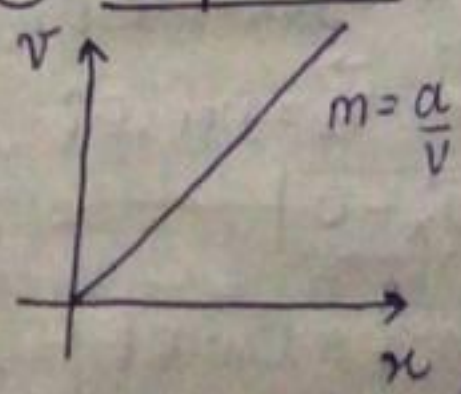


(22) Acc-time



Area = change in velocity

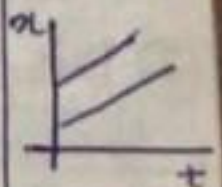
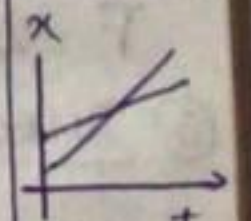
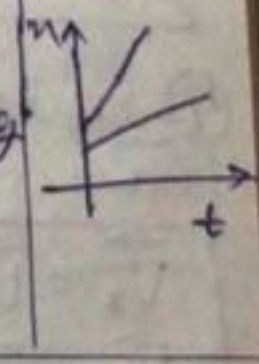
(23) Vel-position



(23) Relative Motion in 1-D

(a) overtake & $t = \frac{l_A + l_B}{V_A - V_B}$

(b) opp direction $\quad t = \frac{l_A + l_B}{V_A + V_B}$

If $V_A = V_B$	$V_{AB} = 0$	$x_{AB} = \text{const}$	
If $V_A > V_B$	$V_{AB} = +ve$ $V_{BA} = -ve$	$\vec{x}_{AB}$ = decrease then increase	
If $V_A < V_B$	$V_{AB} = -ve$ $V_{BA} = +ve$	$\vec{x}_{AB}$ = Increasing	

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