t(secs)

$V = 10 m/s$ @ 40secs

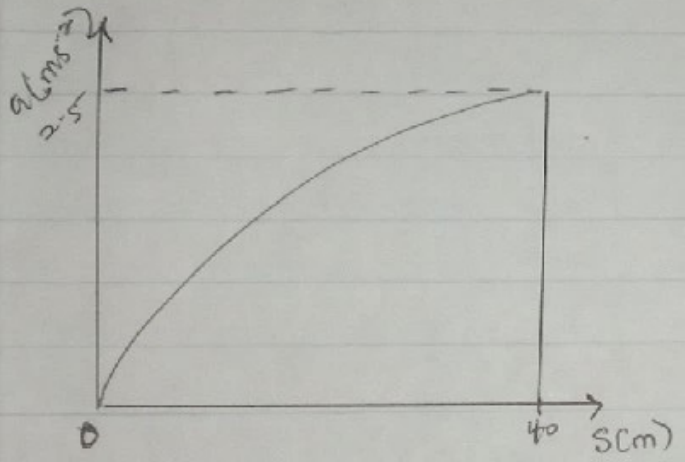
$V = 0.25s$

$a = V \cdot \frac{dv}{ds} = 0.25s(0.25)$

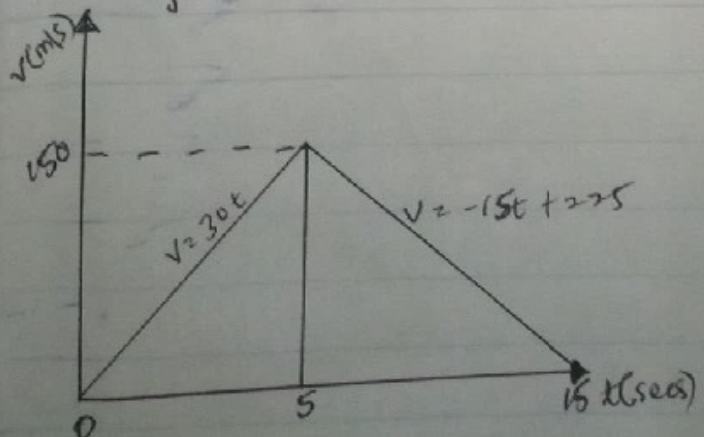
$= 0.0625s$

$a = 0.0625s$

at $s = 40$, $a = 2.5 ms^{-2}$



(6) The dragster starts from rest and has a velocity described by the graph. Construct the s-t graph & during the time interval $0 \leq t \leq 15s$. Also, determine the total d. travelled during this time interval.



$ds = dt \cdot v$

$0 \leq t \leq 15s$

$V = 30t$

$S = 15t^2 m$.

when $t = 5secs$.

$S = 15(5)^2 = 375m$

$V = -15t + 225$

Using the time interval

$5 \leq t \leq 15s$

$\int_{375}^{S} ds = \int_{5}^{t} -15t^2 + 225t$

$S - 375 = \left(\frac{-15t^2}{2} + 225t\right) - (-187.5 + 1125$

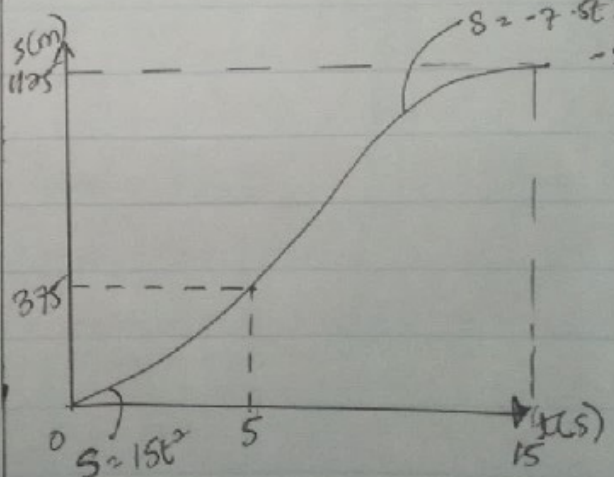
$S - 375 = \left(\frac{-15t^2}{2} + 225t\right) - 937.5$

$S = \left(\frac{-15t^2}{2} + 225t\right) - 562.5$

$S = -7.5t^2 + 225t - 562.5$

$S = -7.5(15)^2 + 225(15) + 562.$

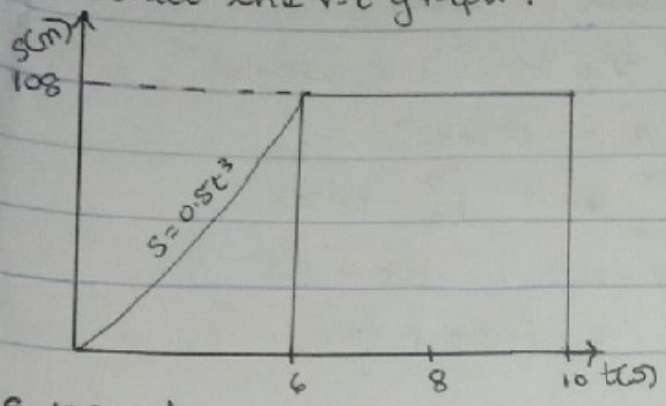
$S = 1125m$.



DEPT : CIVIL ENGINEERING.
COURSE : ENG. MECHANICS
DATE : 22-05-2020

ASSIGNMENT.

1.) The particle travels along a straight track such that its post. is described by an s-t graph Construct the v-t graph.



s-t graph.

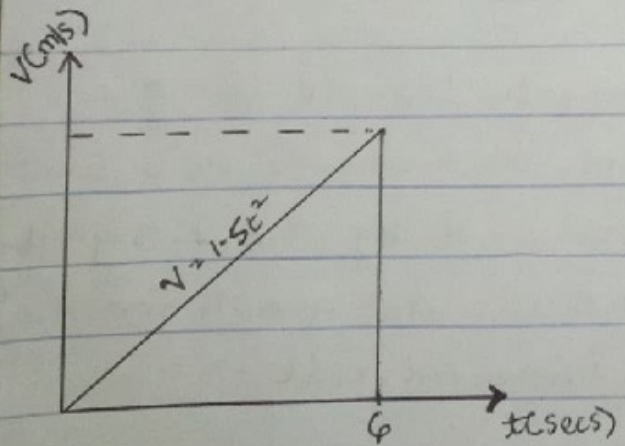
$v = ds/dt$

$s_1 = 0.5t^3$, $v = \frac{d(0.5t^3)}{dt} = 1.5t^2$

$v_1 = 1.5t^2$ m/s

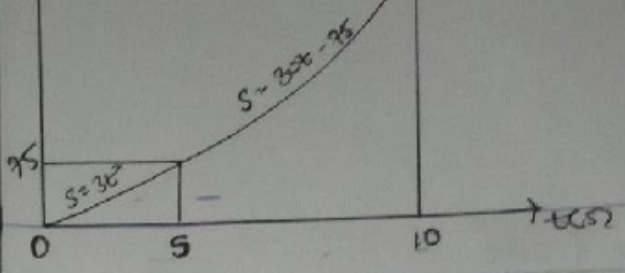
$s_2 = 108t^0$

$v_2 = ds_2/dt = 0$ m/s.



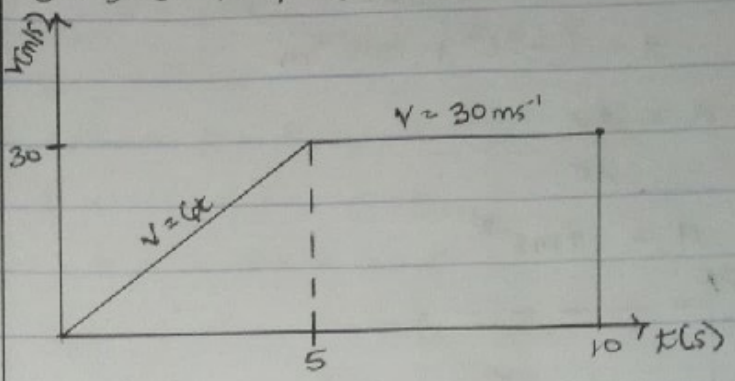
v-t graph.

(2.) The sports car travels along a straight road such that its post. is described by the graph. Construct the v-t and a-t graphs



$s = 3t^2$, $v = ds/dt = 6t\ ms^{-1}$

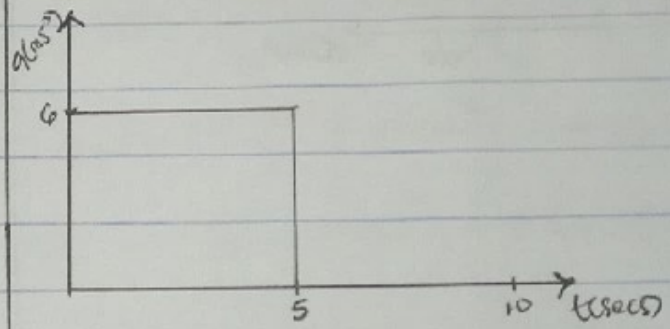
$s = 30t - 75$, $v = ds/dt = 30\ ms^{-1}$



v-t graph.

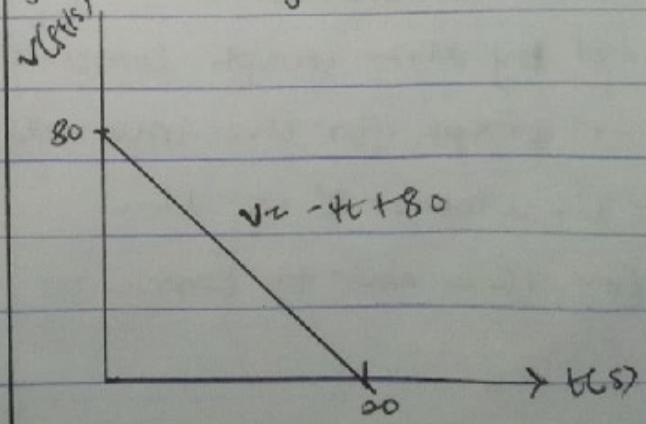
$a_1 = dv/dt = 6ms^{-2}$

$a_2 = dv/dt = 0ms^{-2}$



a-t graph.

(3.) A van travels along a straight road with a velocity described by the graph. Construct the s-t & a-t graphs during the same period. Takes



$v = (-4t + 80)\ ms^{-1}$

$\int ds = \int v\,dt$

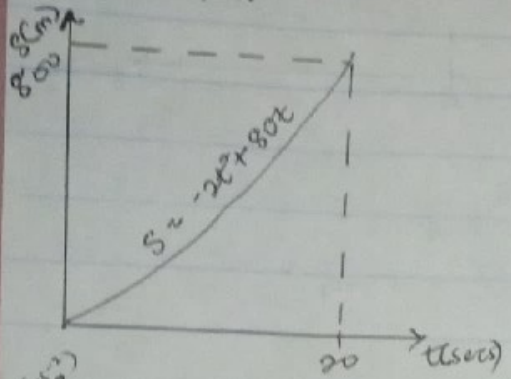
$s = \int (-4t + 80)\,dt$

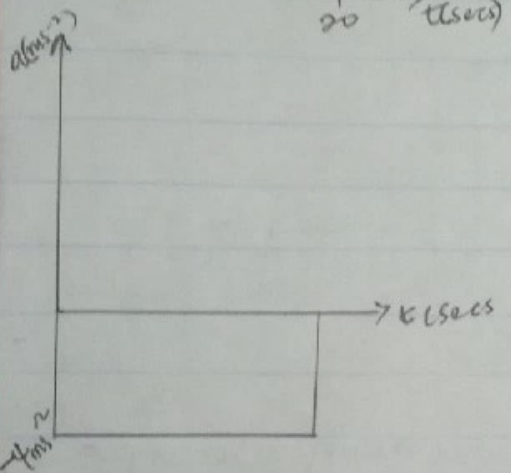
$s = -2t^2 + 80t$

$s = (-2t^2 + 80t)\,m$

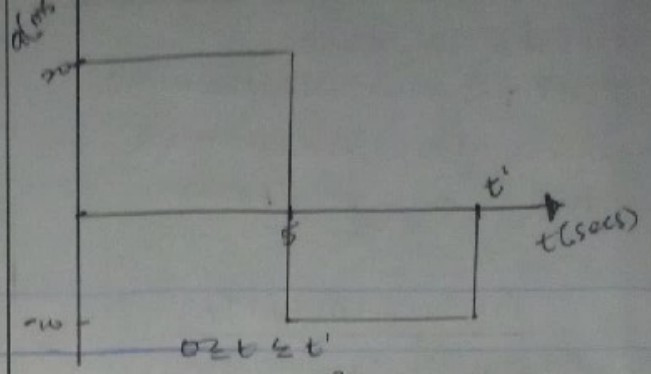
$a = \frac{dv}{dt}$

$a = -4\,ms^{-2}$





(4) The dragster starts from rest and has an acceleration described by the graph. Construct the v-t graph for the interval $0 \le t \le t'$, where t' is the time for the car to come to rest.



$0 \le t \le t'$

$a = 20\,ms^{-2}$

$\int_0^v dv = \int_0^t 20\,dt$

$v = 20t\,ms^{-1}$

when $t = 5$secs

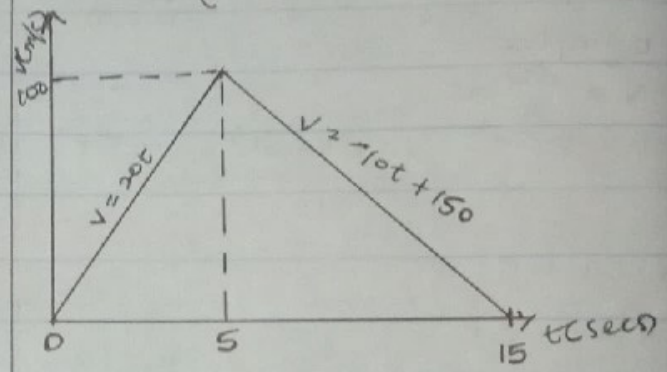
$v = 20(5) = 100\,ms^{-1}$

$a = -10\,ms^{-2}$

$\int_{100}^{v} dv = \int_5^t -10\,dt$

$v - 100 = -10t + 50$

$v = (-10t + 150)\,m/s$



v - t graph.

(5) A bicycle travels along a straight road where its velocity is described by the v-s graph. Construct the a-s graph for the same time interval.