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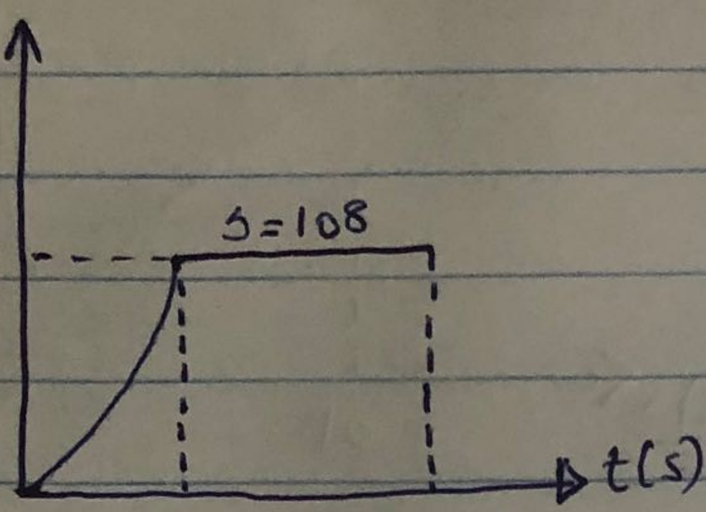
18/ENG04/018.
Electrical/Electronics Engineering.

1.



$v = dy/dt$

$v = 1.5t^2$, at $t = 6s$

$v = 1.5 \times 6^2$

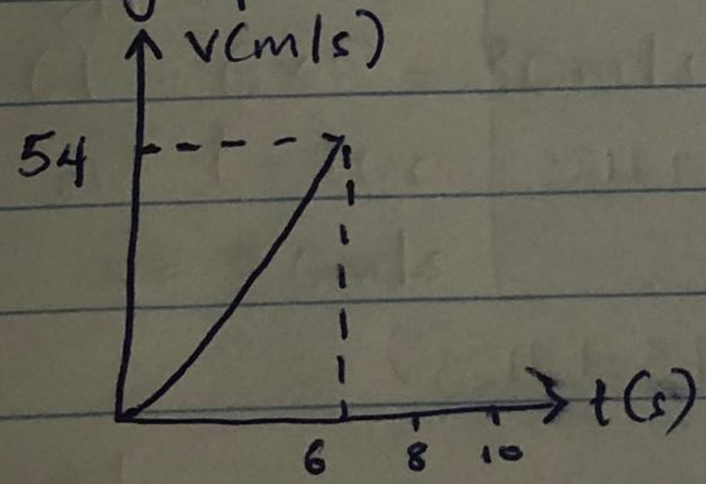
$= 1.5 \times 36$

$v = 54 m/s$.

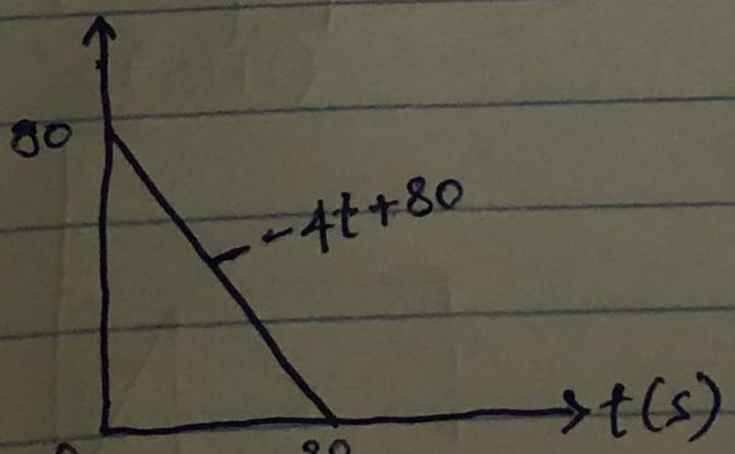
from $t = 6s - 10s$, $s = 108$

$\therefore v = 0$

V-t graph



2.



i $S = \int v dt$

$S = \int (-4t + 80)$

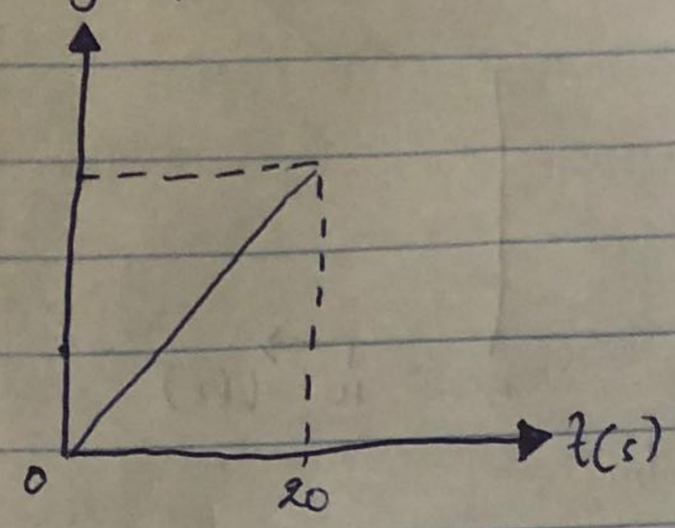
$S = -2t^2 + 80t$

at $t = 20s$

$S = -2(20)^2 + 80(20)$

$S = 1600 - 800 = 800m$

S-t graphi



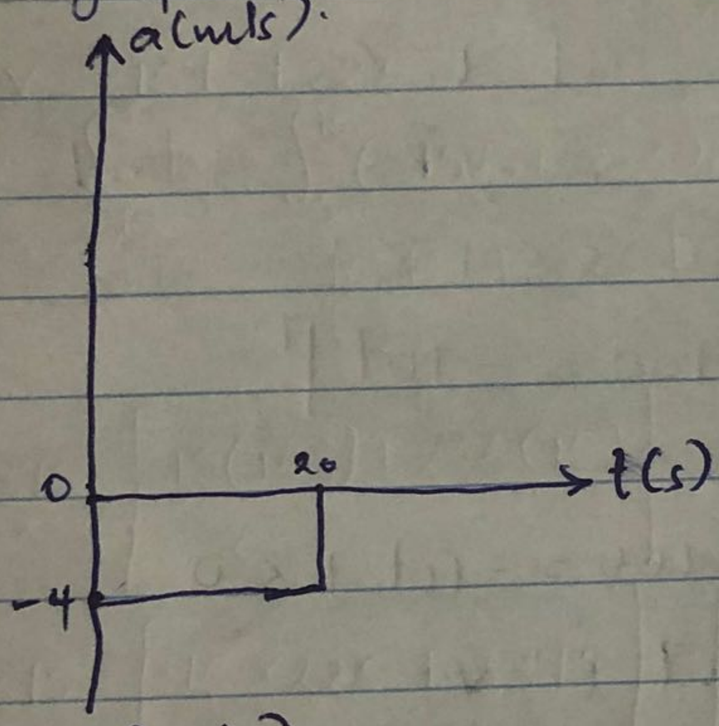
ii acceleration.

$a = dv/dt$

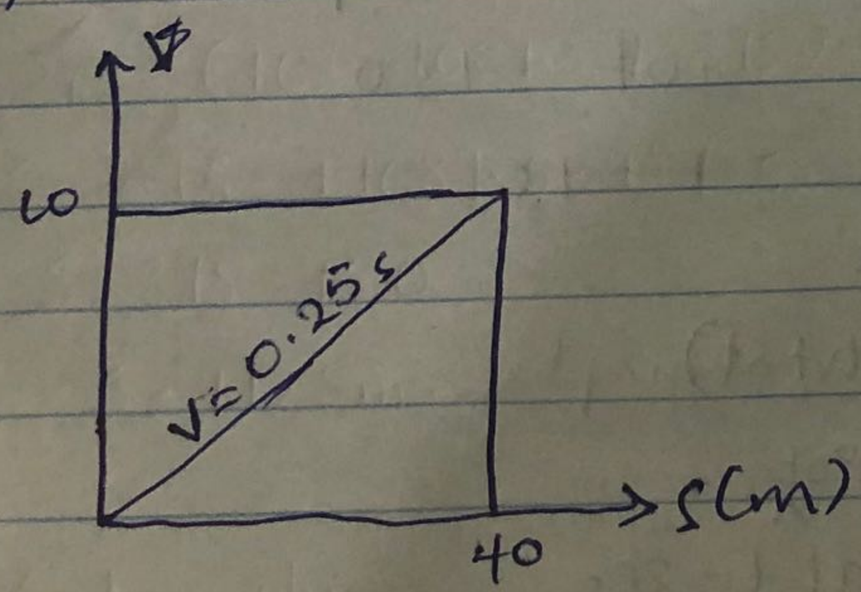
$a = -4 m/s^2$

at $t = 20_2$, $a = -4 m/s^2$.

a-t graph.



3) V(m/s).



$a = (dv/ds)v$

$v = 0.25s$

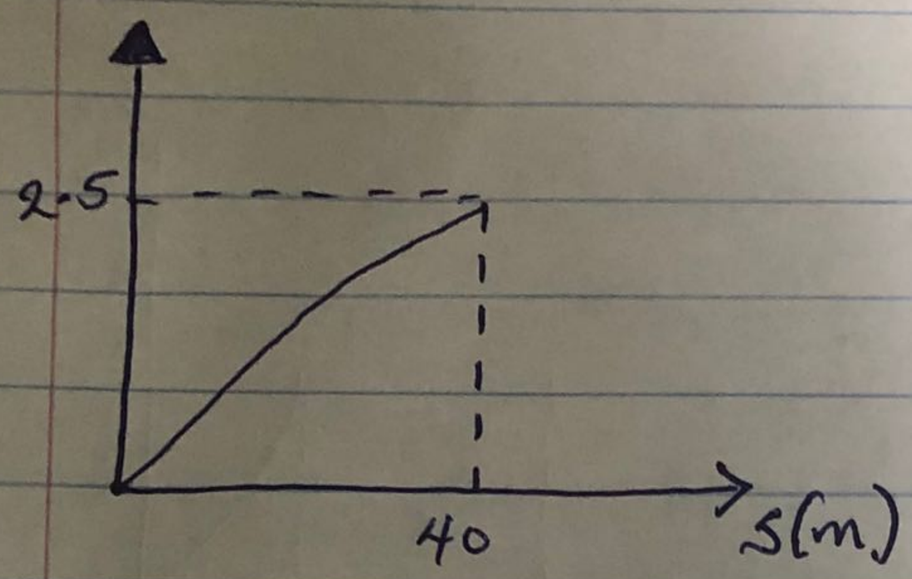
$a = 10 \times d(0.25)ds$

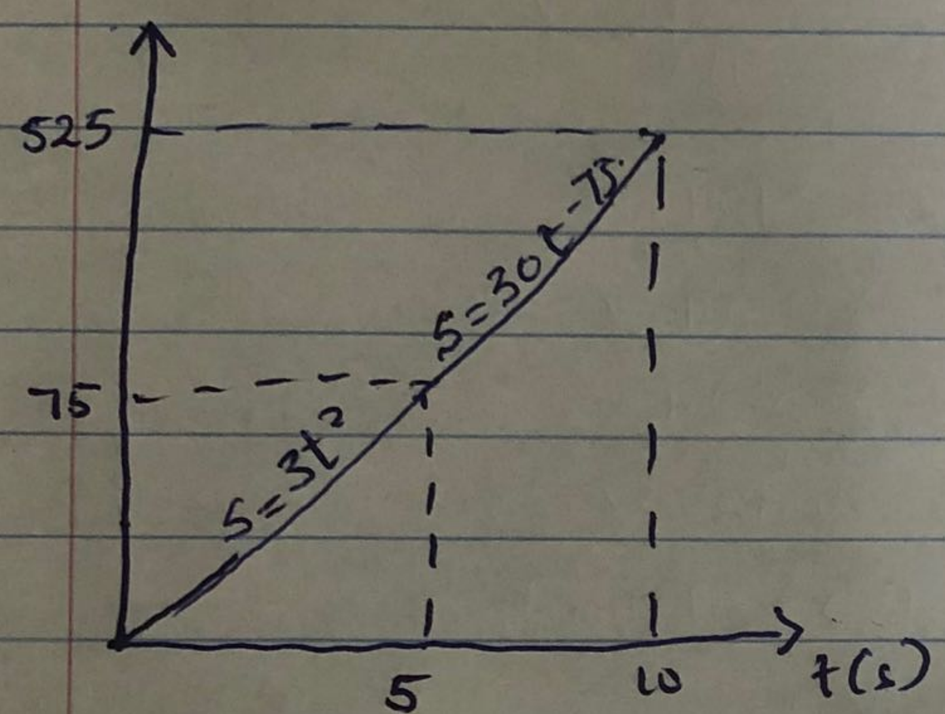
$a = 10 \times 0.25$

$a = 2.5 m/s$

a-s graph.

a(m/s)²





ii $v = ds/dt$, at $t = 5s$.

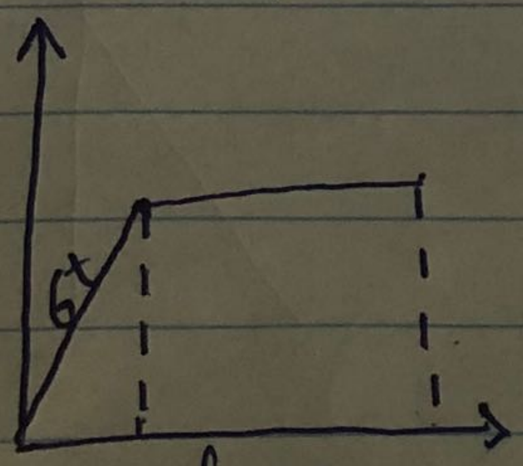
$v = 6t = 6 \times 5 = 30 m/s$

at $t = 10s$

$v = 30 m/s$

v-t graph.

v(m/s)



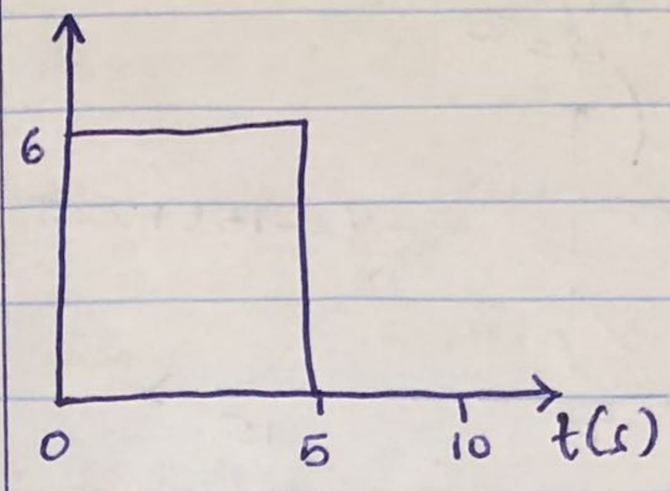
ii) $a = dv/dt$

at $t = 5$

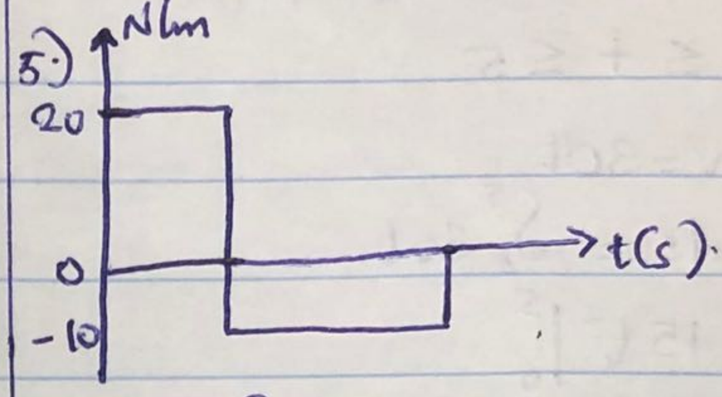
$a = 6 m/s$

at $t = 20s$

$a = 0 m/s$



5) N/m



i. $v = \int a\,dt$

$v = \int 20\,dt$

$v = 20t$

at $t = 5s$

$v = 20 \times 5 = 200 m/s$.

$5s \leq t \leq t$

$v - 100 = -10t \Big|_3^t$

$v - 100 = -10t + 50$

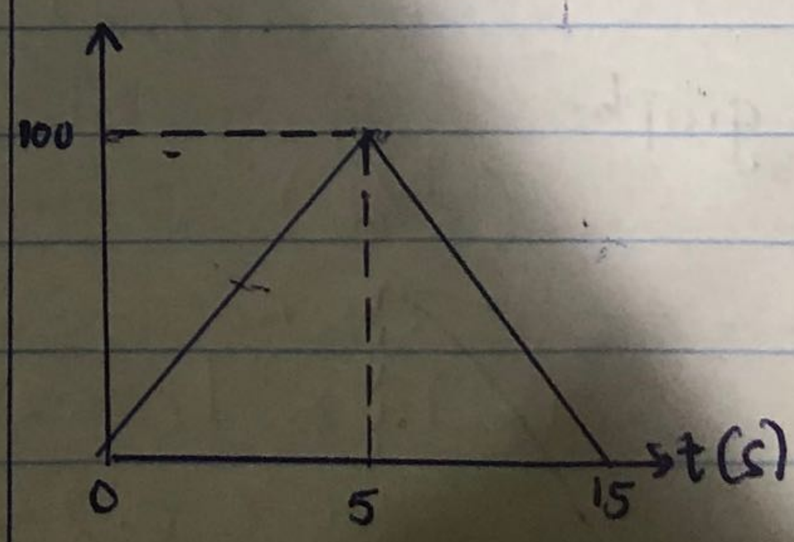
at t', $v = 0$

$0 - 100 - 10t + 50$

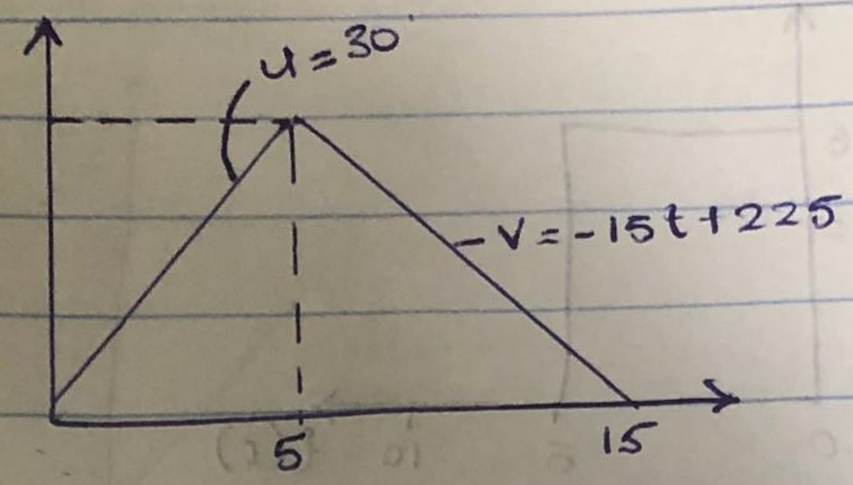
$10t = 150$

$t = 15s$.

v-t graph.



6.



$0 \leq t \leq 5$

$v = 30t$

$\int_0^3 ds = \int_0^5 30t$

$S = 15t^2 \Big|_0^5$

$S = 15(5)^2 - 15(0)^2$

$S = 15 \times 25$, $S = 375m$.

$5 \leq t \leq 15s$.

$v = -15t + 225$

$\int_{375}^{3} ds = \int_5^{15} (-15t + 225)dt$

$S - 375 = \frac{-15t^2}{2} + 225t \Big|_5^{15}$.

$8 - 375 = \left[\frac{-15(15^2)}{2} + 225(15)\right] - \left[\frac{15(5)^2}{2} + 225(5)\right]$

$S - 375 = \left[\frac{-15 \times 225}{2} + 3375\right] - \left[\frac{-15 \times 25}{2} + 1125\right]$

$S - 375 = (-1687.5 + 3375) - (-187.5 + 1125)$

$S - 375 = +1687.5 - 987.5$

$S - 375 = 750$

$S = 1125m$.

S-t graph.