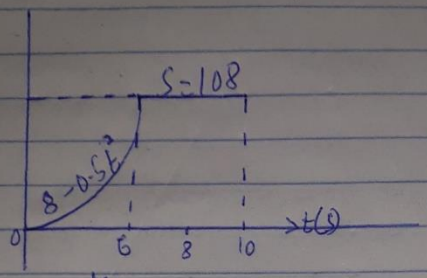
Ebitu, Ukpono Friday
18/ENG04/027

ENG234
Electrical Electronics Engineering

1.



$V = ds/dt$

$V = 1.5t^2$

at $t = 6sec$

$V = 1.5 \times 6^2$

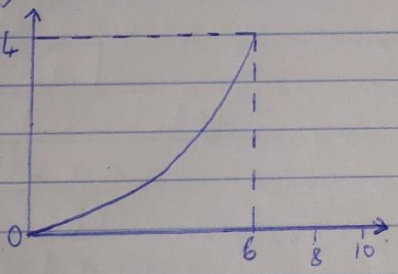
$= 1.5 \times 36$

$V = 54 m/s$

From $t = 6s - 10s$, $S = 108$

$\therefore V = 0 m/s$

V-t graph



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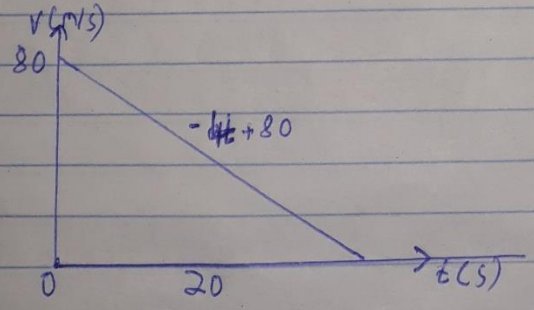


i $S = \int V dt$

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

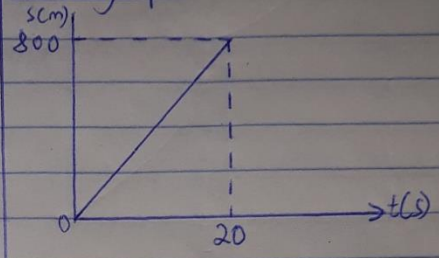
$S = -2t^2 + 80t$

at $t = 20s$

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

$S = 1600 - 800 = 800m$

S-t graph



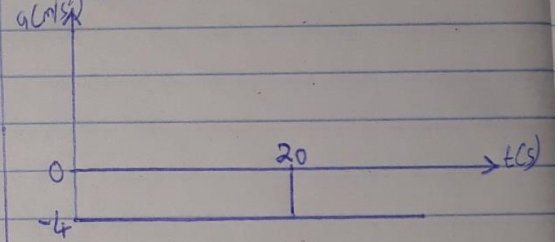
ii) acceleration

$a = dv/dt$

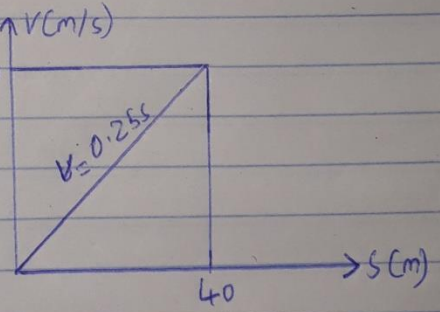
$\therefore a = -4m/s^2$

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

a-t graph



3)



$a = \left(\frac{dV}{dS}\right)V$

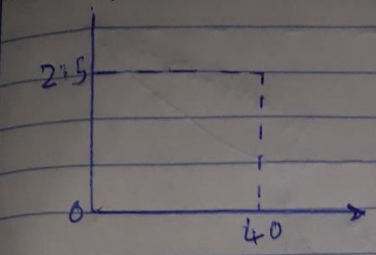
$V = 0.25s$

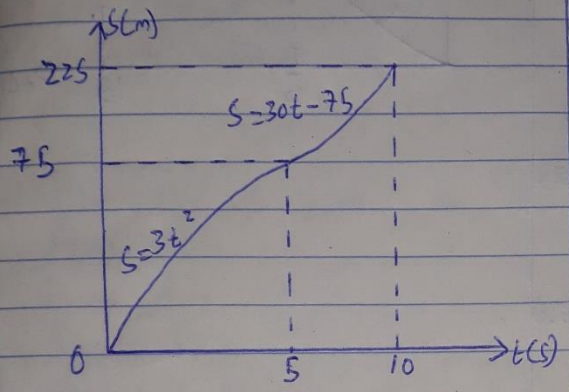
$a = 10 \times d(0.25S)/dS$

$a = 10 \times 0.25$

$a = 2.5 m/s^2$

a-s graph





i $V = ds/dt$

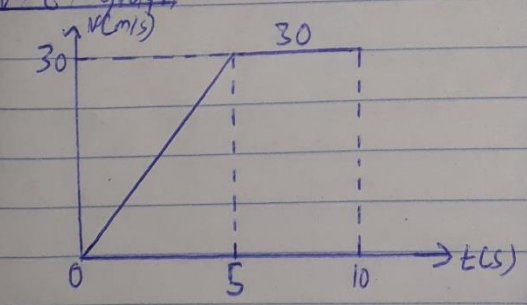
at $t = 5$sec

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

at $t = 10$sec

$V = 30$m/s

V-t graph



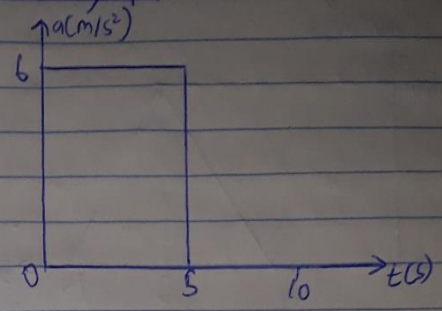
ii $a = dV/dt$

at $t = 5$,

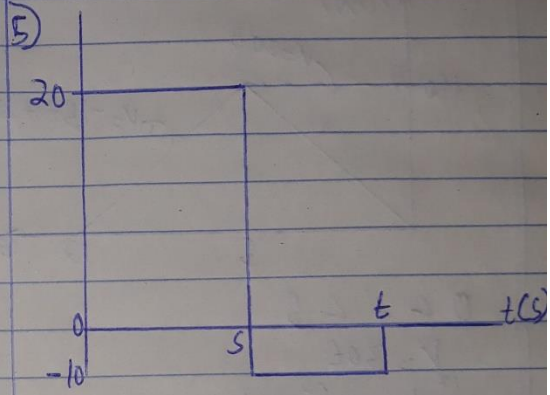
$a = 6$m/s²

at $t = 10$s $a = 0$m/s²

a-t graph



5)



i) $V = \int a\,dt$

$V = \int 20\,dt$

$V = 20t$

at $t = 5$s

$V = 20 \times 5 = 100$m/s

$5s < t < t'$

$\int_{100}^{V} dV = \int_{0}^{t'} -10\,dt$

$V - 100 = -10t' + 10(5)$

$V - 100 = -10t' + 50$

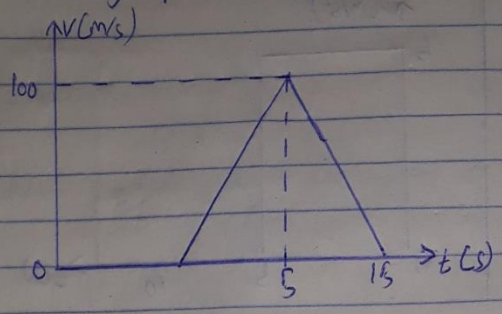
at t', $V = 0$

$0 - 100 = 10t + 50$

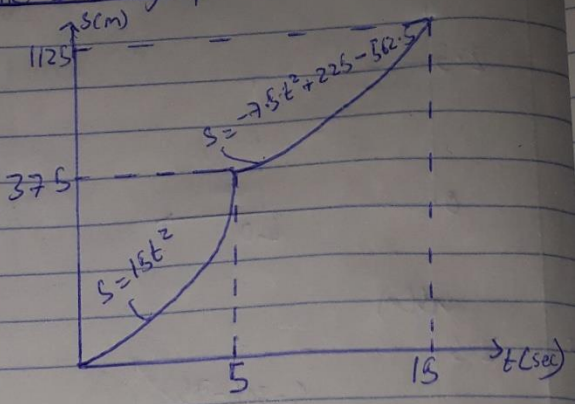
$10t' = 150$

$t' = 15$s

V-t graph



The S-t graph



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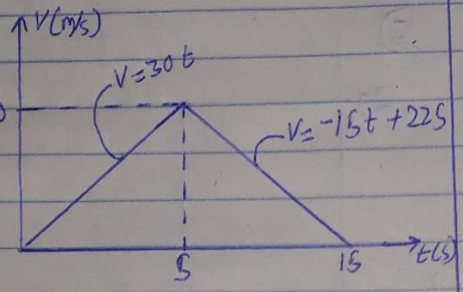

$0 \leq t \leq 5$

$V = 30t$

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

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

$S = 15(5)^3 - 15(3)^2$

$S = 15 \times 25$

$S = 375m$

$5 \leq t \leq 15$

$V = -15 + 225$

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

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

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

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

$S - 375 = 1687.5 - 937.5$

$S = 1125m$