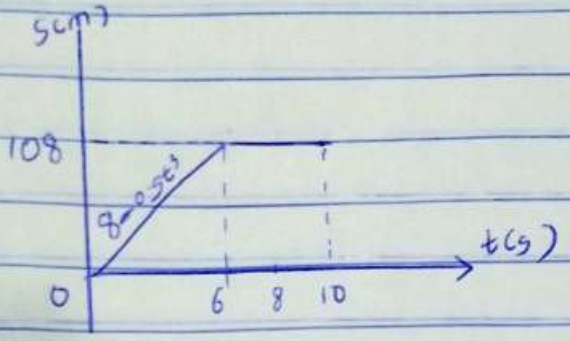
EBONG PRINCE VINCENT

18/ENG04/028

ELECTRICAL ELECTRONICS

1.



$v = ds/dt$

$v = 1.5t^2$

at $t = 6s$

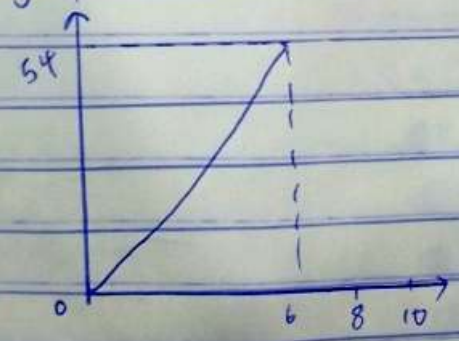
$v = 1.5 \times 6^2$

$= 1.5 \times 36$

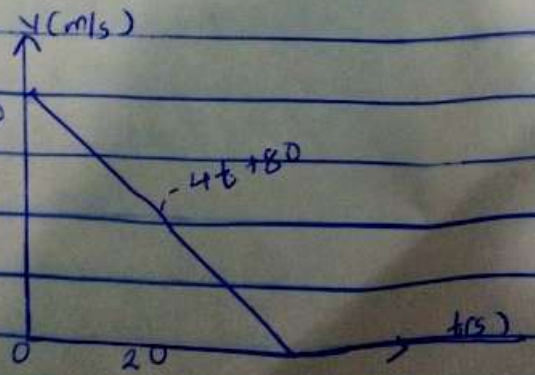
$v = 54\ m/s$ from $t = 6s - 10s$, $S = 108$

$\therefore v = 0$ //

v - t graph



2.



i) $S = \int v\,dt$

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

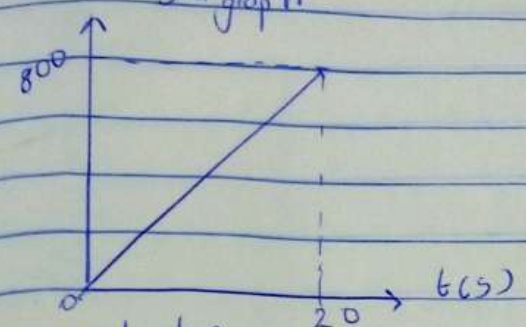
$S = -2t^2 + 80t$

at $t = 20s$

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

$S = 1600 - 800 = 800m$ //

S-t graph



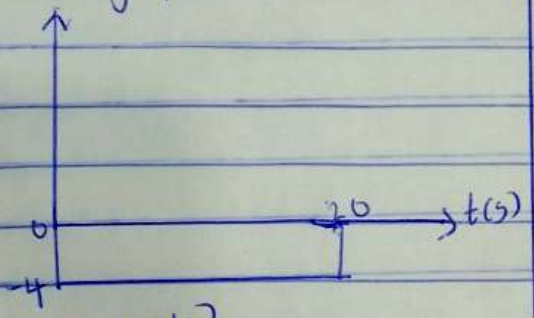
ii) acceleration

$a = dv/dt$

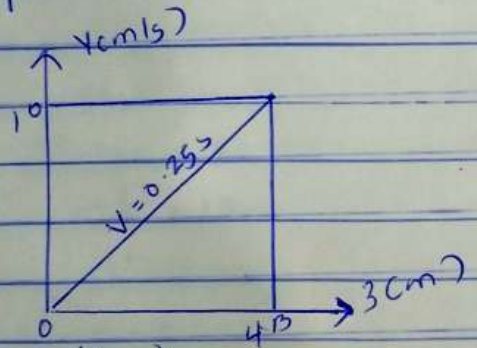
$\therefore a = -4 m/s^2$

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

a-t graph



3



$a = (dv/ds)v$

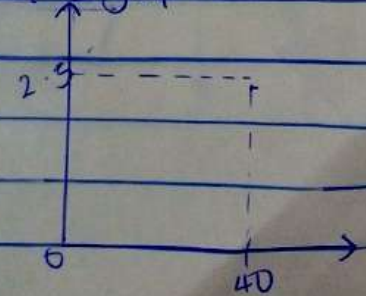
$v = 0.25s$

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

$a = 10 \times 0.25$

$a = 2.5 m/s^2$

a-s graph



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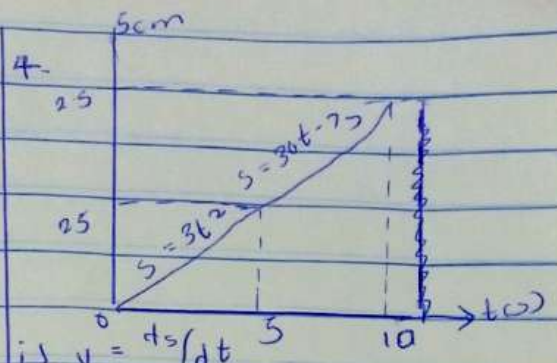


ii) $v = ds/dt$

at $t = 5s$

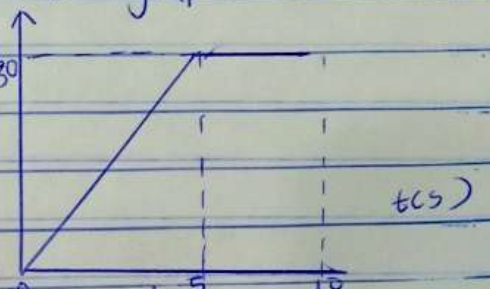
$v = 6t$ ~~$\times 6 \times$~~ $= 6 \times 5$

$= 30 m/s$

at $t = 10s$

$v = 30 m/s$

v-t graph



ii) $a = dv/dt$

at $t = 5$

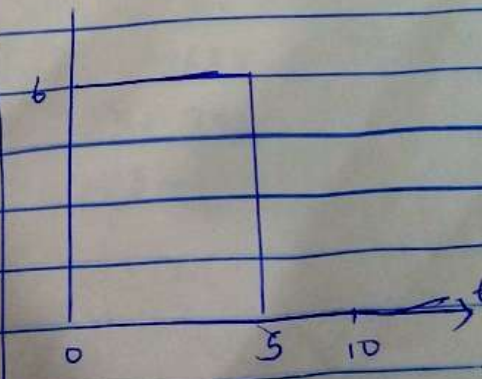
$a = 6 m/s^2$

at $t = 10s$

$a = 0 m/s^2$

$a = 0 m/s^2$

a - t graph



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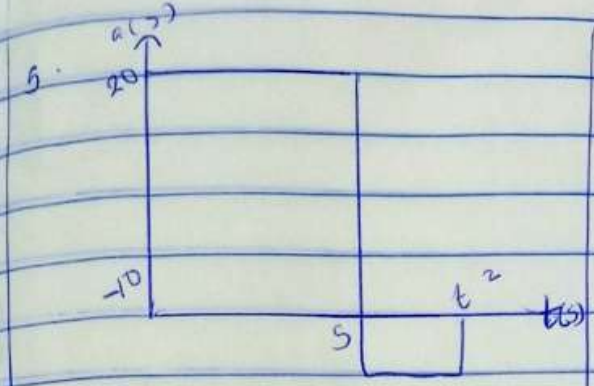


i) $v = \int a\,dt$

$v = \int 20\,dt$

$v = 20t$

at $t = 5$s

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

$5\text{s} < t \leq t_1$

$\int_{100}^{v} dv = \int_{0}^{t'} -10\,dt$

$v - 100 = -10t' \Big|_5^{t'}$

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

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

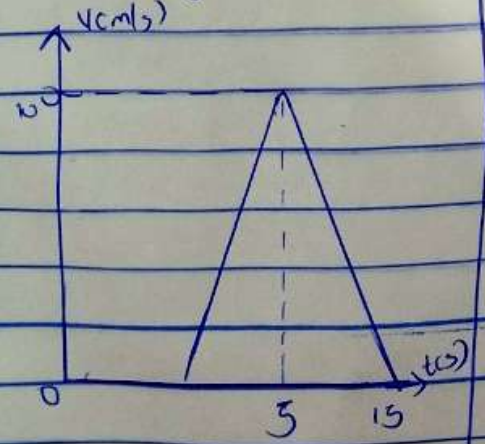
at t', $v = 0$

$0 - 100 = 10t' + 50$

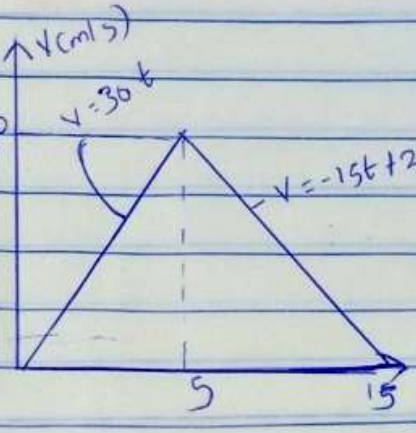
$10t' = 150$

$t' = 15$s

v-t graph



6.



$0 \leq t \leq 5$,

$v = 30t$

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

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

$s = 15(5)^2 - 15(5)^2$

$s = 15 \times 25$

$s = 375$m

$5_1 \leq t \leq 15$s

$v = -15t + 225$

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

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

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

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

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

$s - 375 = +1687.5 - 937.5$

$s - 375 = 750$

$s = 1125$m