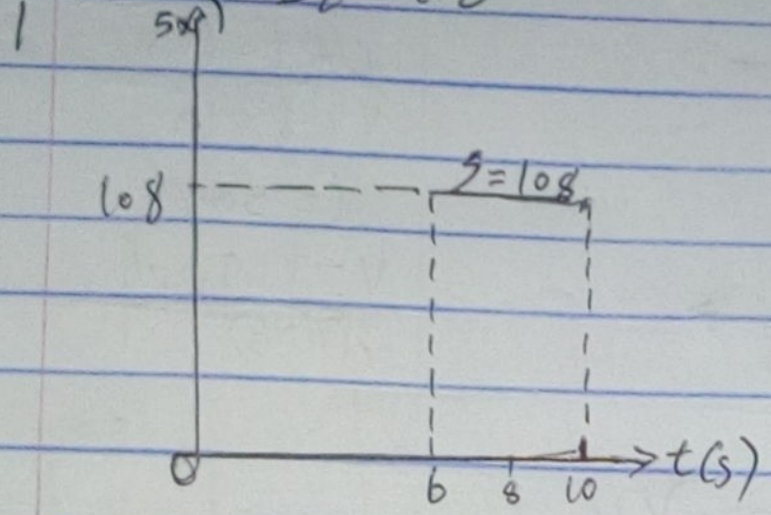
Ogbodo Tochukwu Hilary
Computer Engineering
18/ENG02/070

1)



$V = 1.5t^2$

at $t = 6s$

$V = 1.5 \times 6^2$

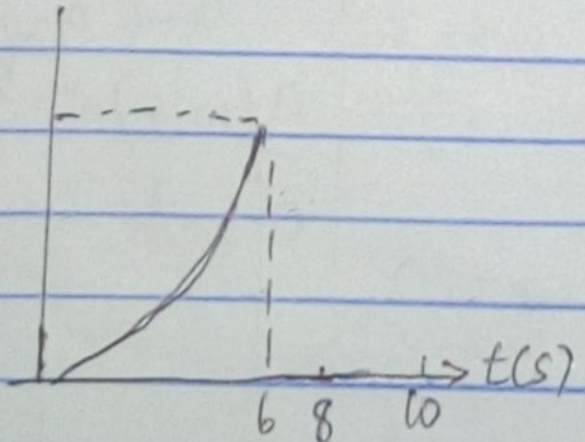
$= 1.5 \times 36$

$V = 54 m/s$

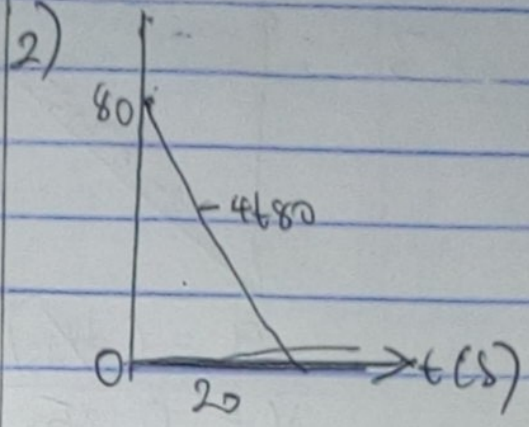
$t = 6s - 10s, S = 108$

$\therefore V = 0$

V-t graph



2)



i) $S = \int v dt$

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

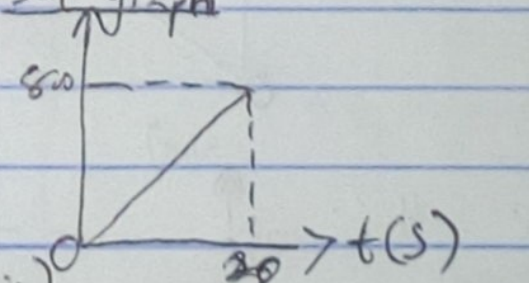
$S = -2t^2 + 80t$

at $t = 20s$

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

$S = 1600 + 800 = 800m$

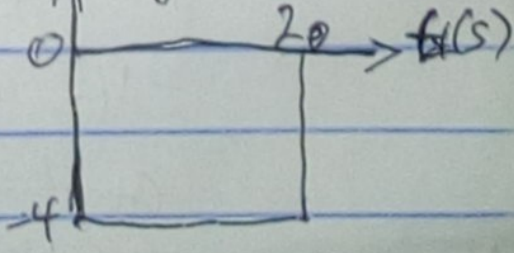
S-t graph



ii) $a = \frac{dv}{dt}$, $\therefore a = -4m/s^2$

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

a-t graph



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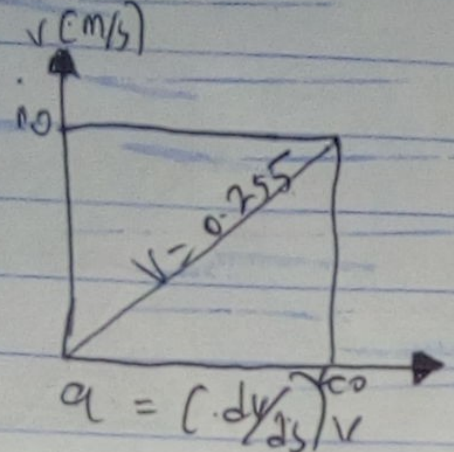


$a = (dv/ds)v$

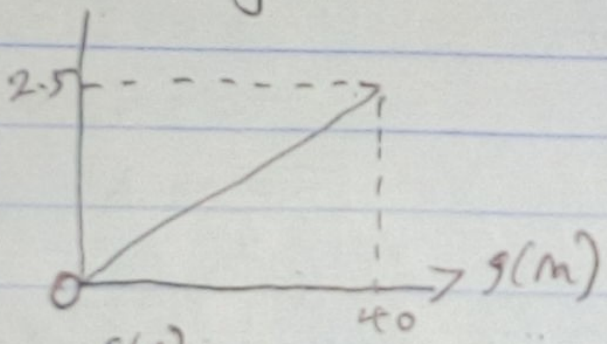
$v = 0.25s$

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

$a = 10 \times 0.25$

$a = 2.5 m/s^2$

a-s graph



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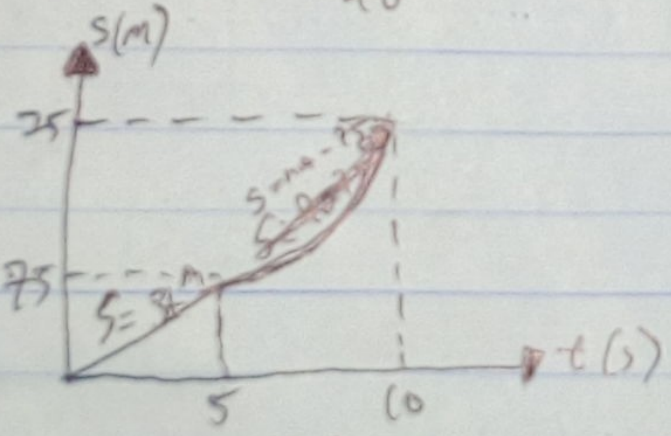


$v = ds/dt$

at $t = 5s$

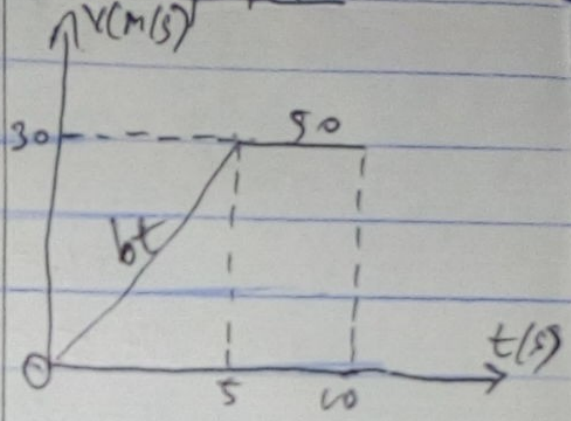
$v = 6t = 6 \times 5 = 30 m/s$

at $t = 10s$

$v = 6 \times 10$

$v = 30 m/s$

v-t graph



ii) $a = dv/dt$

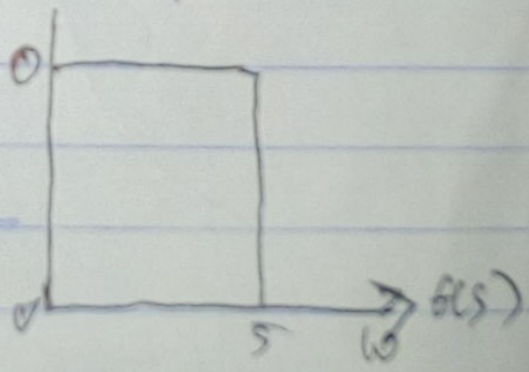
at $t = 5$

$a = 6 m/s^2$

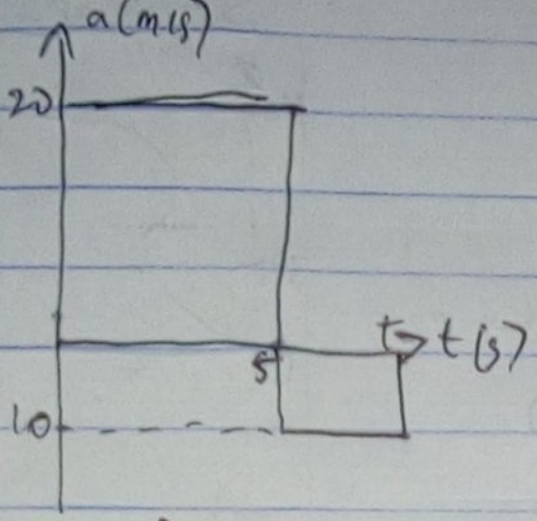
at $t = 10s$

$a = 0 m/s$

a-t graph



5



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

$v = \int 20\,dt$

$v = 20t$

at $t = 5s$

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

$5 \le t \le t$

$\int_{100}^{v} dv = \int_{5}^{t} -10\,dt$

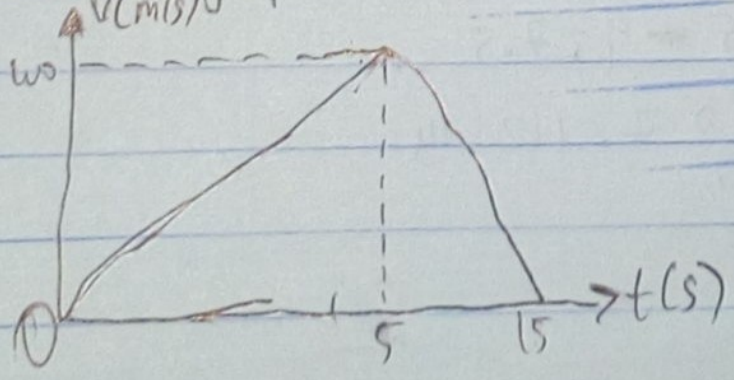
$v - 100 = -10t\,|_5^t$

$v - 100 = -10t + 150$

$v - 100 = -10t + 50$

at $v = 0$, $0 =$

$v - t$ graph



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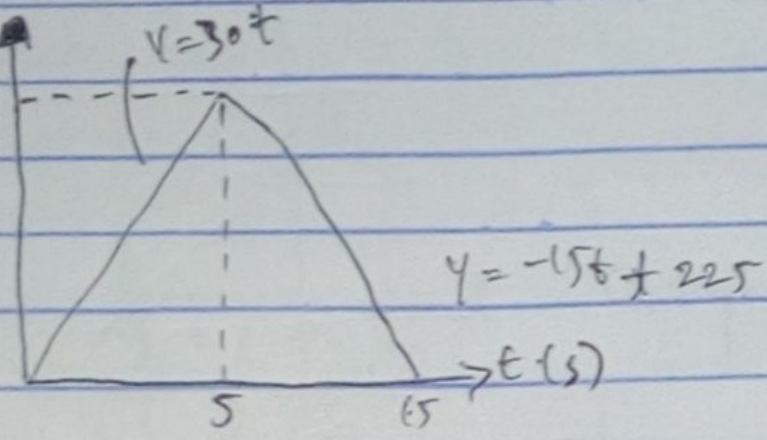

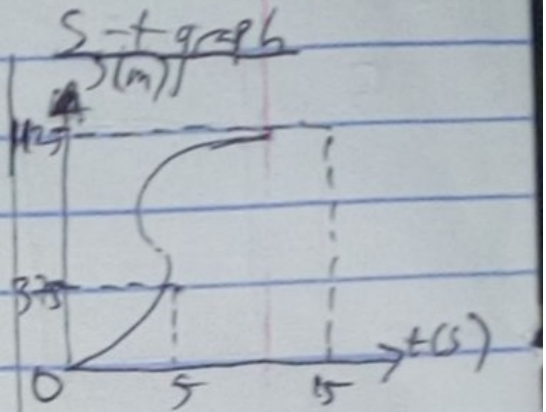

$0 \le t \le 5$

$v = 30t$

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

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

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

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

$5 \le t \le 15$

$v = -15t + 225$

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

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

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

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

$S - 375 = 1687.5 - 937.5$

$S = 375 + 750 = 1125\,m$

$S = 1125\,m$