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Matric: 18/Eng03/041
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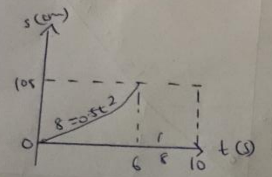


$v = ds/dt$

$v = 1.5t^2$

at $t = 6$

$v = 1.5 \times 6^2$

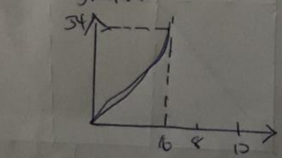
$= 1.5 \times 36$

$= 54$ m/s

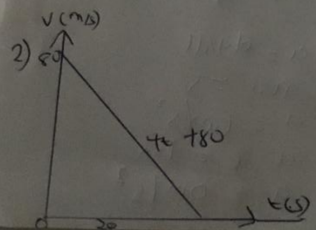
From $t = 6 - 10s$, [illegible]

$\therefore V = 0$

v-t graph



2)



1) $s = \int v\,dt$

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

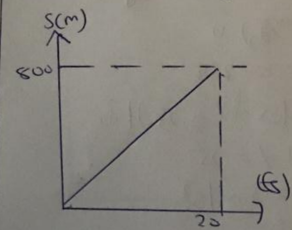
$s = -2t^2 + 80t + 0$

at $t = 20s$

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

$s = 1600 - 800 = 800m$

s-t graph



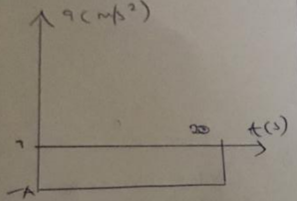
ii) acceleration

$a = dv/dt$

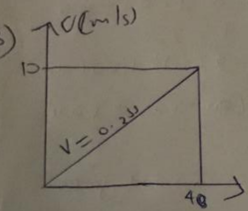
$\therefore a = -4 m/s^2$

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

a-t graph



3)



$a = (dv/ds)\,v$

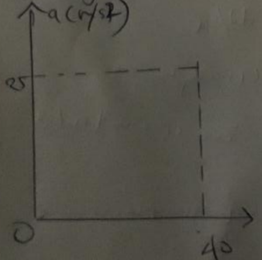
$v = 0.25s$

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

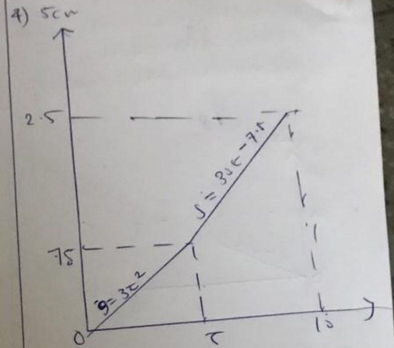
$a = 10 \times 0.25$

$a = 2.5 m/s^2$

a-s graph



4)



i) $v = ds/dt$

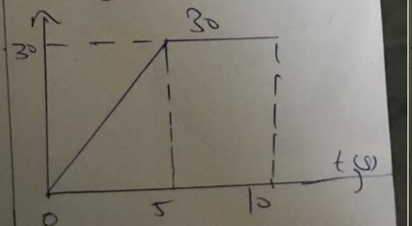
at $t = 5s$

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

at $t = 10s$

$v = 30 m/s$

v-t graph



ii) $a = dv/dt$

at $t = 5$

$a = 6 m/s^2$

at $t = 10s$

$a = 0 m/s^2$

$5_1 \leq t \leq 15$ s

$v = 15t + 225$

$\int_{375}^{s} ds = \int_{5}^{15} (-15t + 225)\,dt$

$s - 375 = -\frac{15t^2}{2} + 225t \Big|_{5}^{15}$

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

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

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

$s - 375 = 1187.5 - 9375$

$s - 375 = 750$

$s = 1125$ m //

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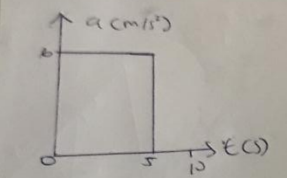
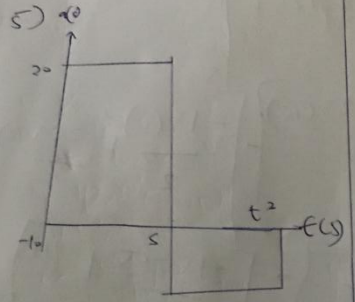
a) q-t graph



b)



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

$v = \int_2 0\,dt$

$v = 20t$

at $t = 5$ s

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

$5 s < t < t'$

$\int_{v_0}^{v} dv = \int_{0}^{t'} -10\,dt$

$v - 100 = -10t \Big|_{5}^{t'}$

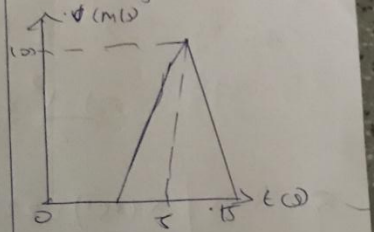
$v = 100 = -10t' + 10(5)$

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

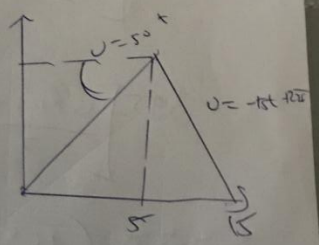
$10t' = 150$

$t' = 15$ s

v-t graph



b)



$0 \leq t \leq 5$

$v = 20t$

$\int_0^s ds = \int_0^5 20t$

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

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

$s = 15 \times 25$

$s = 375$ m