

(i)  $v = \frac{ds}{dt}$   
 $v = \int 20 dt$   
 $v = 20t$   
 at  $t = 5s$

$v = 20 \times 5 = 100 \text{ m/s}$

$5s < t \leq t'$

$\int v dt = \int_{5}^{t'} -10 dt$

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

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

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

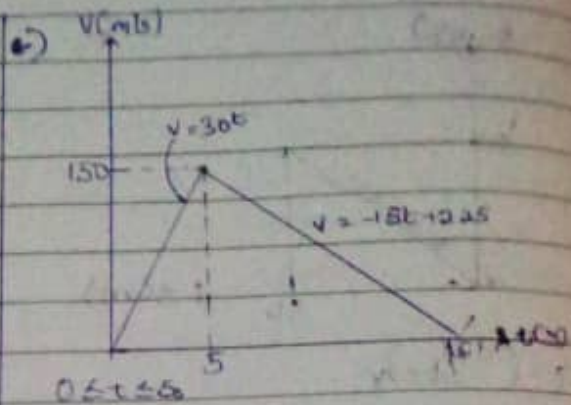
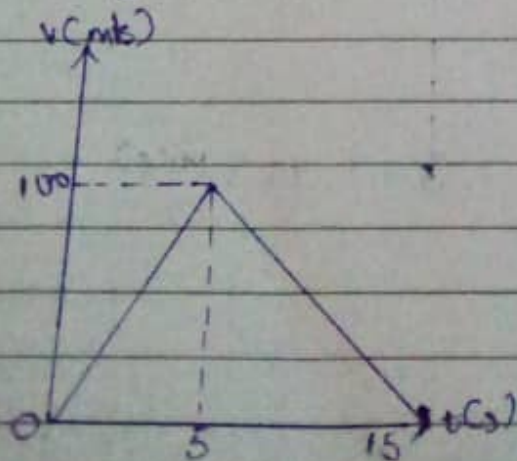
at  $t'$ ,  $v = 0$

$0 - 100 = -10t' + 50$

$10t' = 150$

$t' = 15s$

v-t graph



$0 \leq t \leq 5s$   
 $v = 30t$   
 $\int_0^5 ds = \int_0^5 30t dt$   
 $s = 15t^2 \Big|_0^5$   
 $= 15(5)^2 - (15)0^2$   
 $= 15 \times 25 = 375 \text{ m}$

$5s \leq t \leq 15s$

$v = -15t + 225$

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

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

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

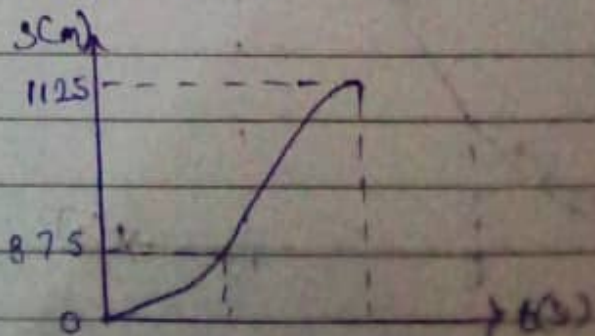
$s - 375 = \left[ \frac{-15 \times 225}{2} + 3375 \right] - \left[ \frac{-15 \times 25}{2} + 1125 \right]$

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

$s - 375 = 1687.5 - 937.5$

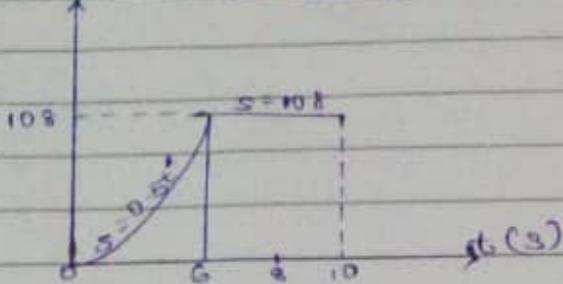
$s - 375 = 750$

$s = 750 + 375 = 1125 \text{ m}$



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1)  $s(m)$   $s-t$  graph.



$$v = ds/dt$$

$$v = 1.5t^2 \text{ at } t = 6s$$

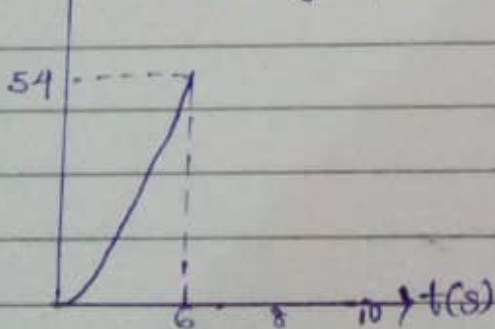
$$v = 1.5 \times 6^2$$

$$= 54 \text{ m/s}$$

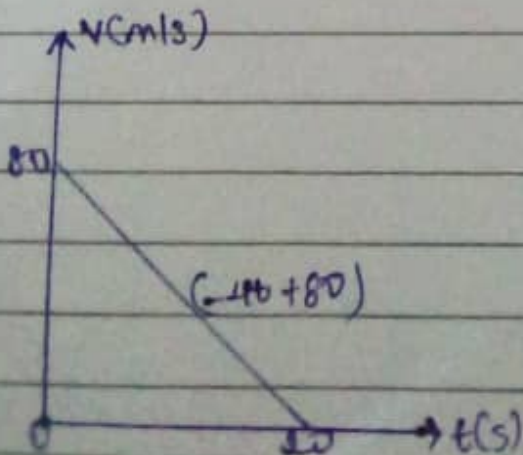
From  $t = 6s - 10s$ ,  $s = 108$

$$v = 0$$

$v(m/s)$   $v-t$  graph.



2)



2a)  $s = \int v dt$

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

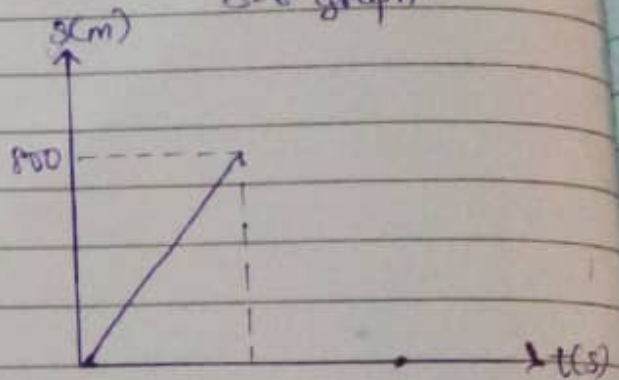
$$s = -2t^2 + 80t \text{ at } t = 20s$$

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

$$= 1600 - 800$$

$$= 800m$$

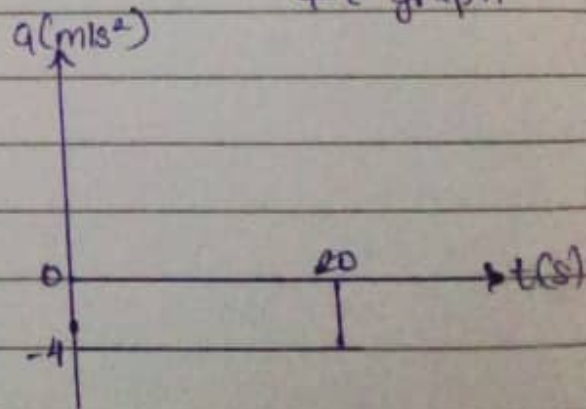
$s-t$  graph:



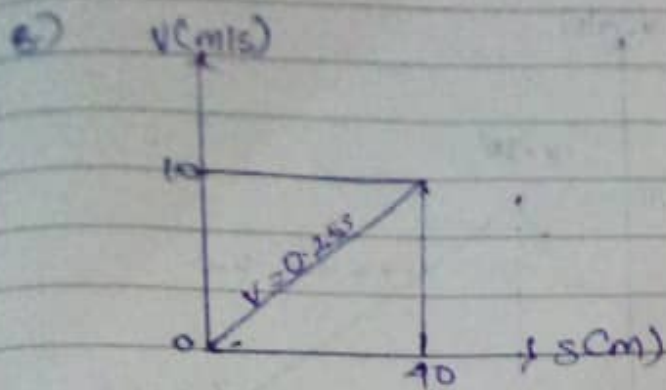
2a)  $a = dv/dt$

$$a = -4 \text{ m/s}^2 \text{ at } t = 20s$$

$a-t$  graph







$$a = \left( \frac{dv}{ds} \right) v$$

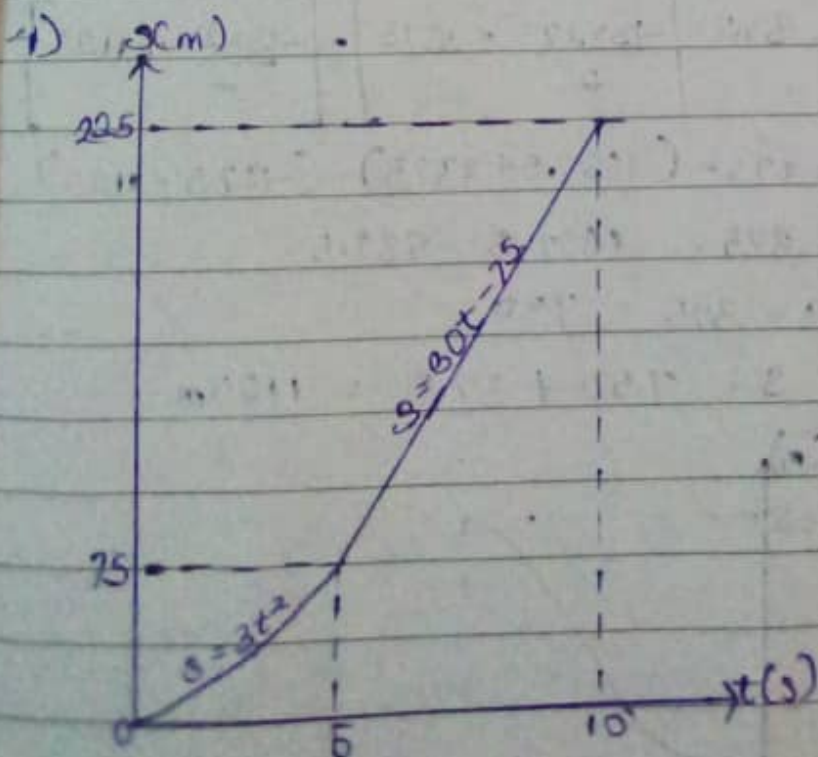
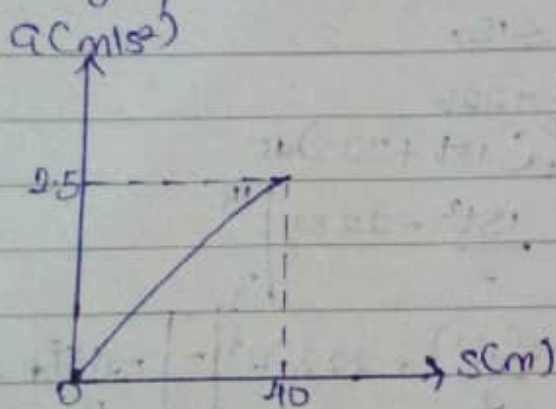
$$v = 0.25s$$

$$a = 10 \times 0.25$$

$$a = 10 \times 0.25$$

$$a = 2.5 \text{ m/s}^2$$

a -  $\rightarrow$  graph.



(i)  $v = ds/dt$

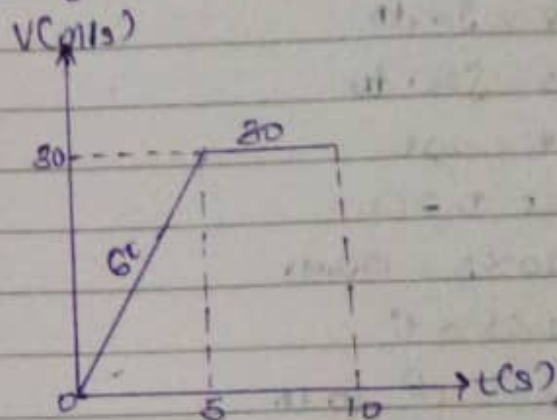
at  $t = 5s$

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

at  $t = 10s$

$$v = 30 \text{ m/s}$$

v-t graph.



(ii)  $a = \frac{dv}{dt}$

at  $t = 5s$

$$a = 6 \text{ m/s}^2$$

at  $t = 10s$

$$a = 0 \text{ m/s}^2$$

a-t graph.

