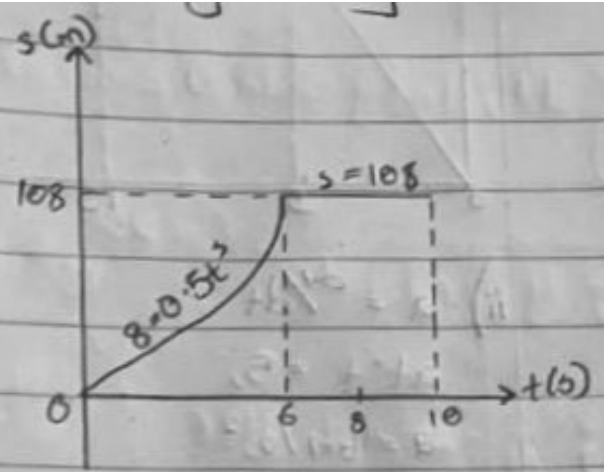
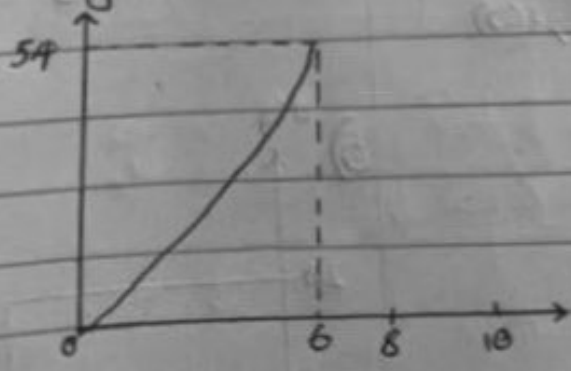


1

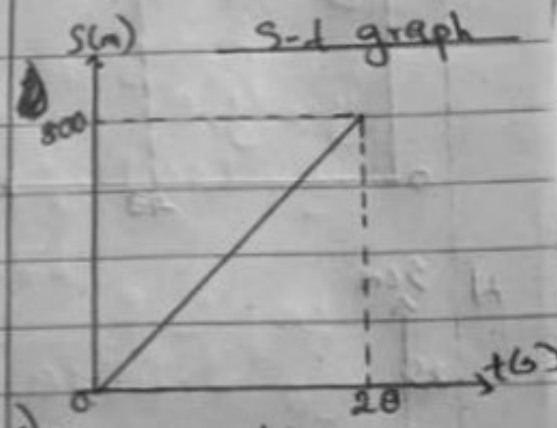


$v = \frac{ds}{dt}$   
 $v = 1.5t^2$   
 at  $t = 6s$   
 $v = 1.5 \times 6^2$   
 $= 1.5 \times 36$   
 $v = 54 \text{ m/s}$   
 from  $t = 6s - 10s$ ,  $s = 108$   
 $\therefore v = 0$

v-t graph

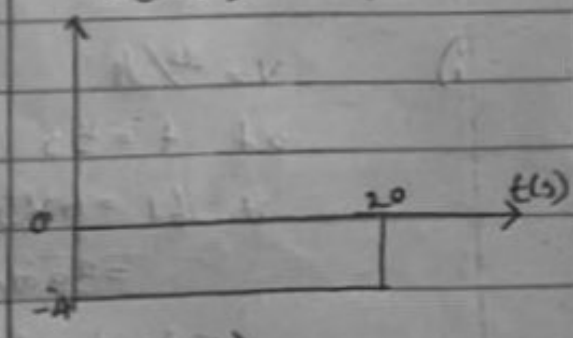


$s = \int v dt$   
 $s = \int (-4t + 80) dt$   
 $s = -2t^2 + 80t$   
 at  $t = 20s$   
 $s = -2(20)^2 + 80(20)$   
 $s = 1600 - 800 = 800 \text{ m}$

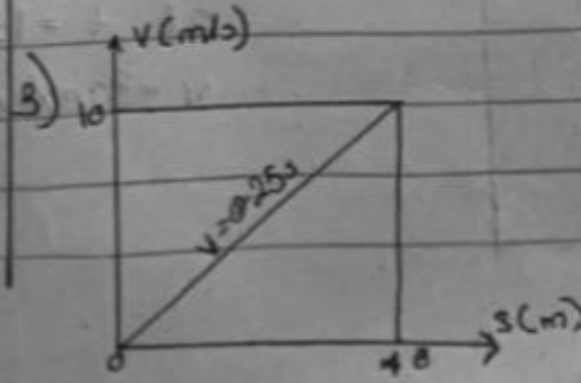
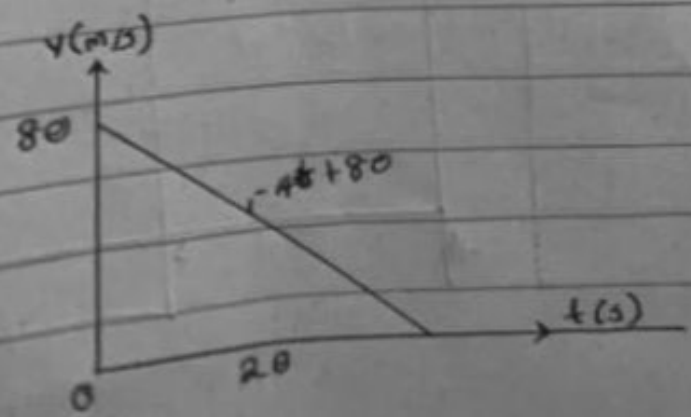


ii) acceleration  
 $a = \frac{dv}{dt}$   
 $\therefore a = -4 \text{ m/s}^2$   
 at  $t = 20$ ,  $a = -4 \text{ m/s}^2$

a-t graph



2



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

$$v = 0.25s$$

$$a = 10 \times \frac{d(0.25s)}{ds}$$

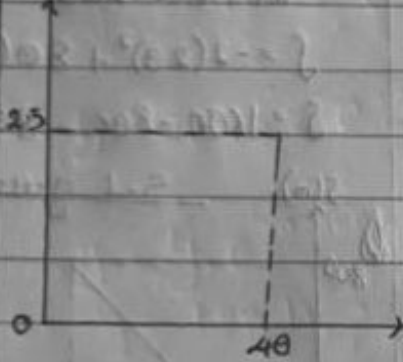
$$a = 10 \times 0.25$$

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

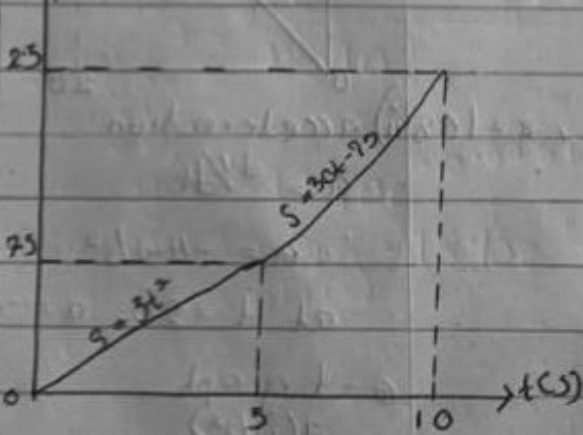
car

a-t graph

a (m/s<sup>2</sup>)



H 5cm



i)  $v = \frac{ds}{dt}$

at  $t = 5s$

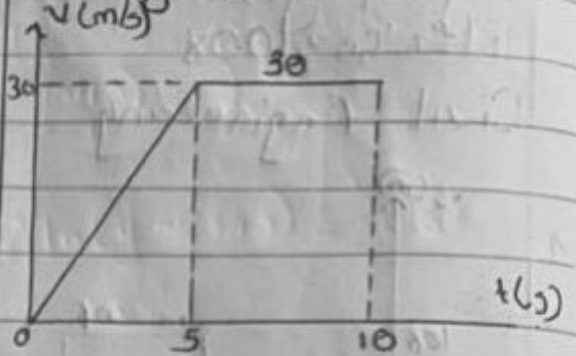
$$v = 6t = 6 \times 5$$

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

at  $t = 10s$

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

v-t graph



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

at  $t = 5s$ ,

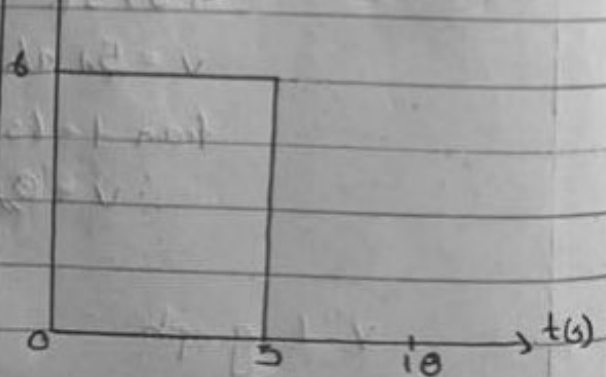
$$a = 6 \text{ m/s}^2$$

at  $t = 10s$

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

a-t graph

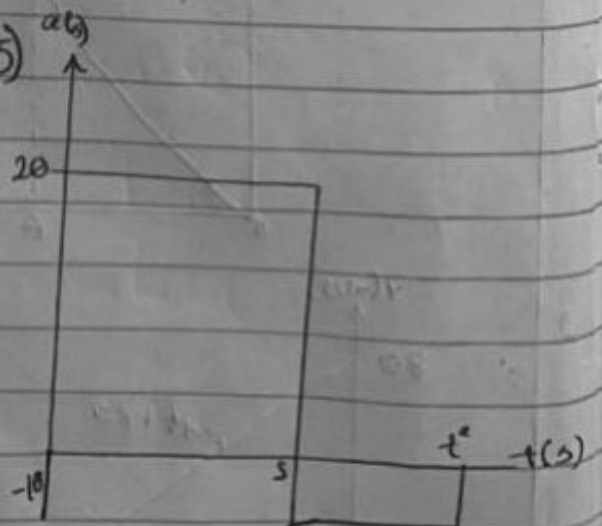
a (m/s<sup>2</sup>)



5) a) ↑

20

-10



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

$$v = \int 20 dt$$

$$v = 20t$$

$$\text{at } t = 5s$$

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

$$5s < t \leq t'$$

$$\int_{100}^v dv = \int_5^{t'} -10 dt$$

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

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

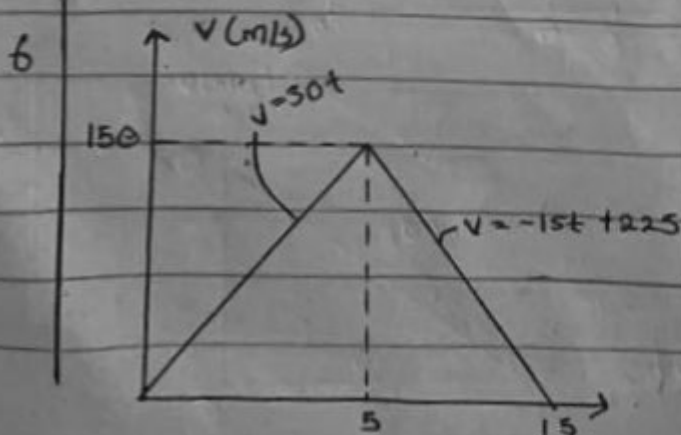
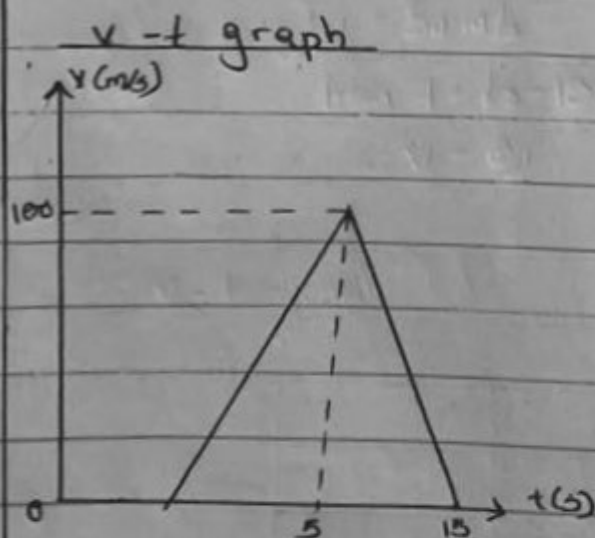
$$v - 100 = -10t' + 50$$

$$\text{at } t', v = 0$$

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

$$10t' = 150$$

$$t' = 15s$$



$$0 \leq t \leq 5$$

$$v = 30t$$

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

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

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

$$s = 15 \times 25$$

$$s = 375 \text{ m}$$

$$5 \leq t \leq 15s$$

$$v = -15t + 225$$

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

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

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

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

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

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

~~$$s - 375 = +1687.5 - 937.5$$~~

~~$$s - 375 = 750$$~~

~~$$s = 1125 \text{ m}$$~~