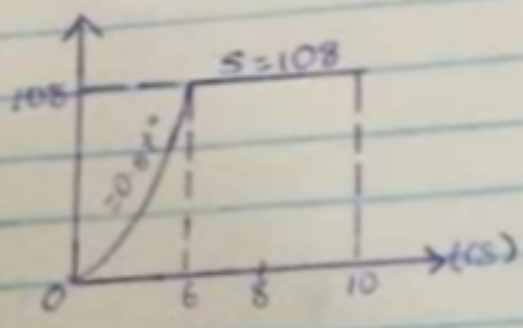


1.)



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

$$v = 1.5t^2$$

at  $t = 6s$

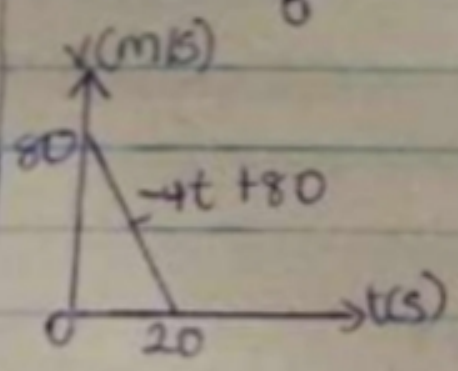
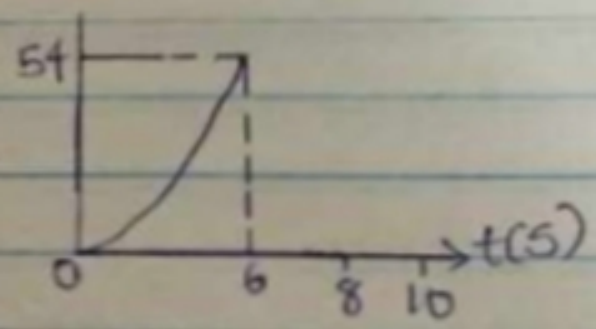
$$v = 1.5 \times 6^2$$

$$= 1.5 \times 36$$

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

from  $t = 6s - 10s$ ,  $s = 108$   
 $\therefore v = 0$

v-t graph

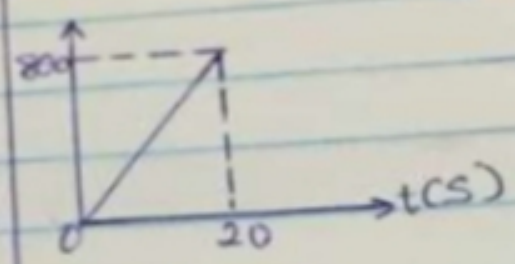


$$s = \int v dt$$

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

$$s = 1600 - 800 = 800 \text{ m}$$

s-t graph



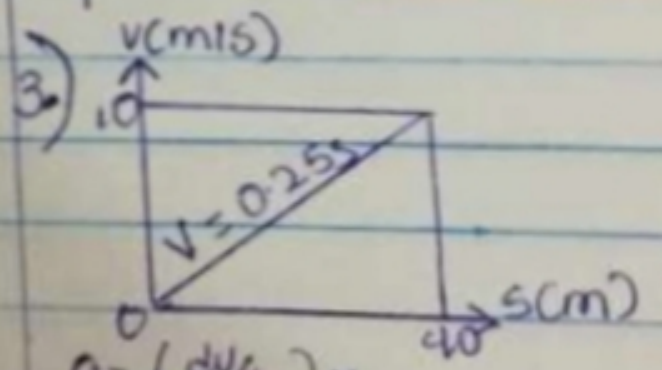
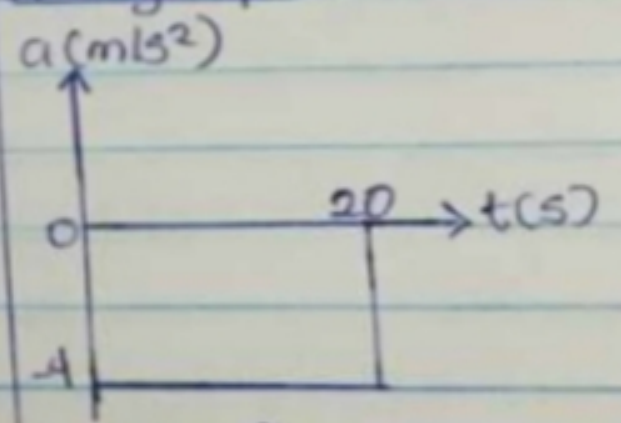
ii. acceleration

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

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

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

a-t graph



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

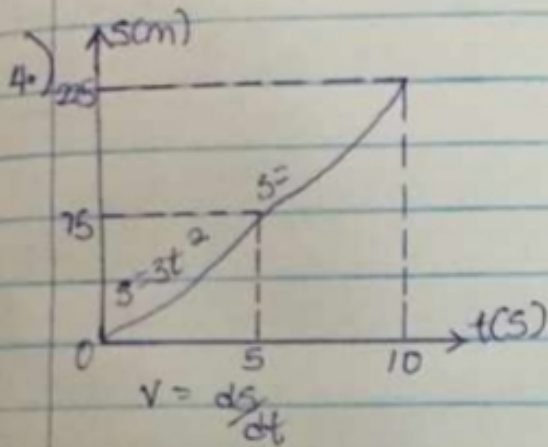
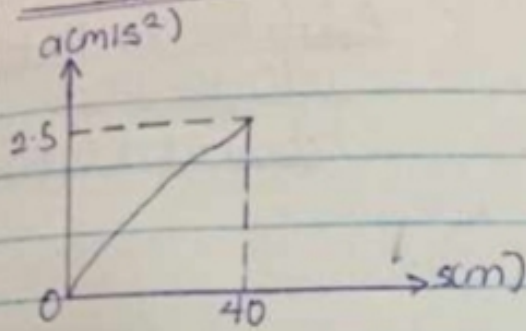
$$v = 0.25s$$

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

$$a = 10 \times 0.25$$

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

### a-s graph



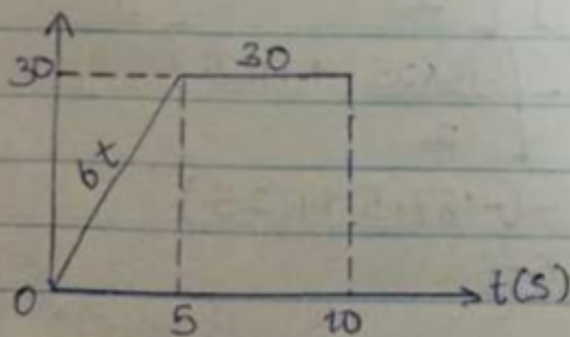
at  $t = 5s$

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

at  $t = 10s$

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

### v-t graph



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

at  $t = 5s$

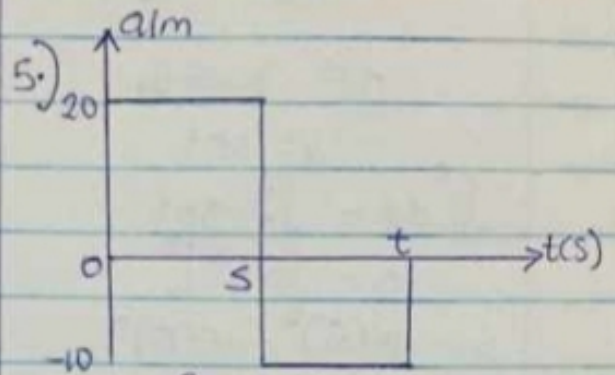
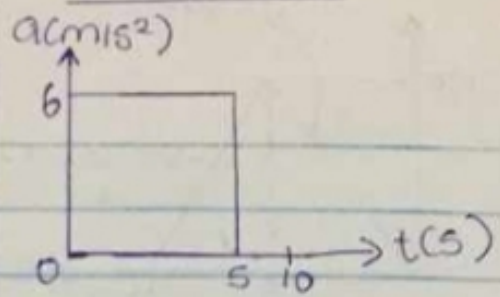
$$a = 6 \text{ m/s}^2$$

at  $t = 10s$

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

### a-t graph

### a-t graph



i.  $v = \int a dt$

$$v = \int 20 dt$$

$$v = 20t$$

at  $t = 5s$

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

$5s < t \leq t$

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

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

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

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

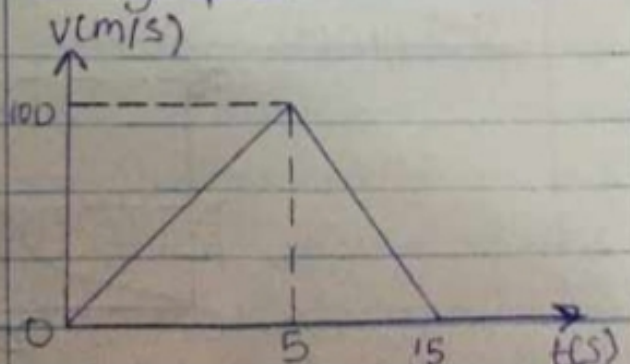
at  $t', v = 0$

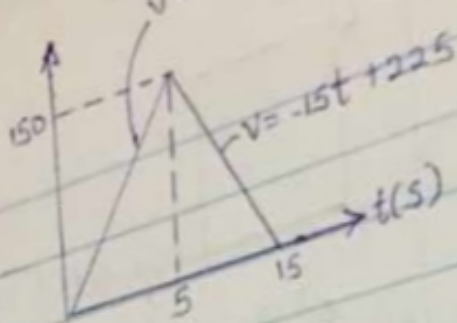
$$0 - 100 = -10t' + 50$$

$$10t' = 150$$

$$t' = 15s$$

### v-t graph





$$0 \leq t \leq 5$$

$$V = 30t$$

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

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

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

$$s = 15 \times 25$$

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

$$5 \leq t \leq 15$$

$$V = -15t + 225$$

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

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

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

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

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

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

$$s - 375 = 750$$

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

s-t graph

