

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

$$v = 1.5t^2$$

$$\text{at } t = 6s$$

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

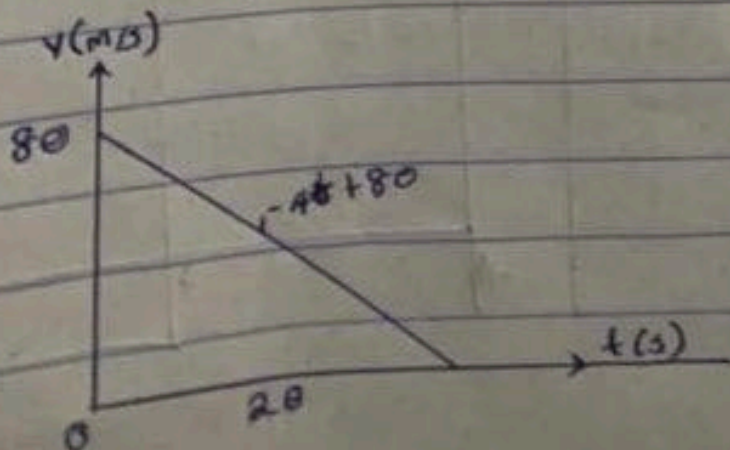
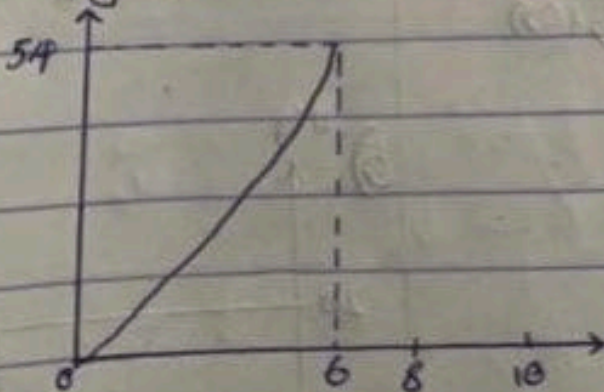
$$= 1.5 \times 36$$

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

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

$$\therefore v = 0$$

v-t graph



$$i) \quad s = \int v dt$$

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

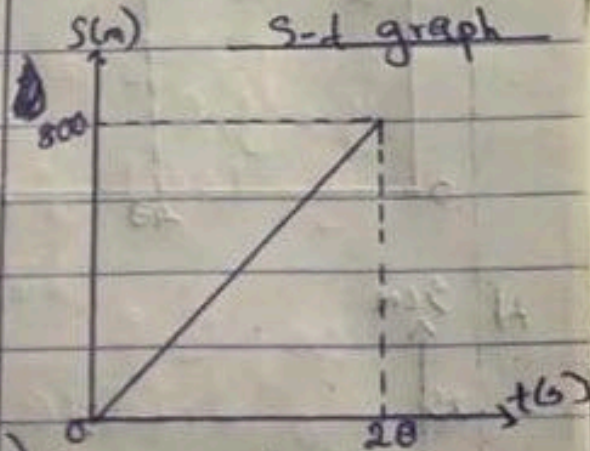
$$s = -2t^2 + 80t$$

$$\text{at } t = 20s$$

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

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

s-t graph



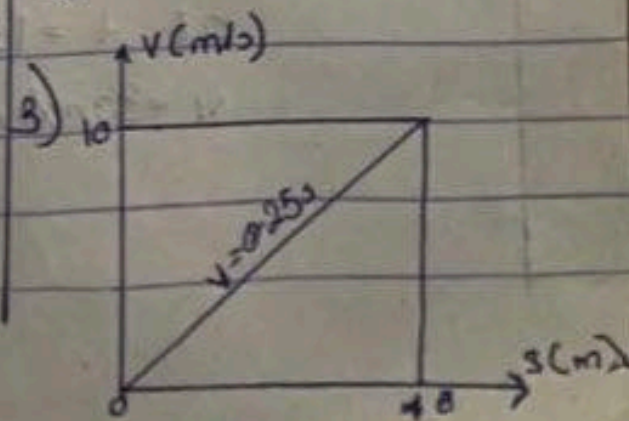
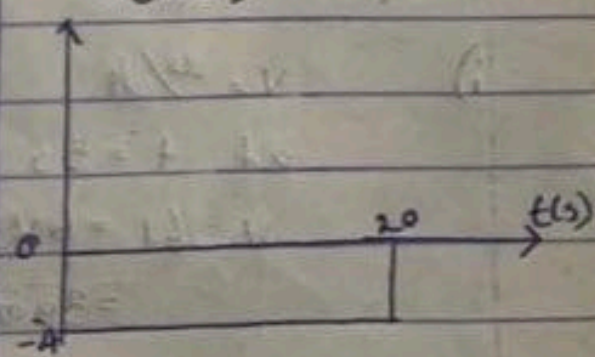
ii) acceleration

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

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

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

a-t graph





$$v = \int a dt$$

$$v = \int 20 dt$$

$$v = 20t$$

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

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

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

$$\int_{100}^v dv = \int_0^{t'} -10 dt$$

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

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

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

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

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

$$10t' = 150$$

$$t' = 15s$$

$$0 \leq t \leq 5$$

$$v = 30t$$

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

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

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

$$s = 15 \times 25$$

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

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

$$v = -15t + 225$$

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

$$s - 375 = \left[ -\frac{15t^2}{2} + 225t \right]_5^{15}$$

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

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

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

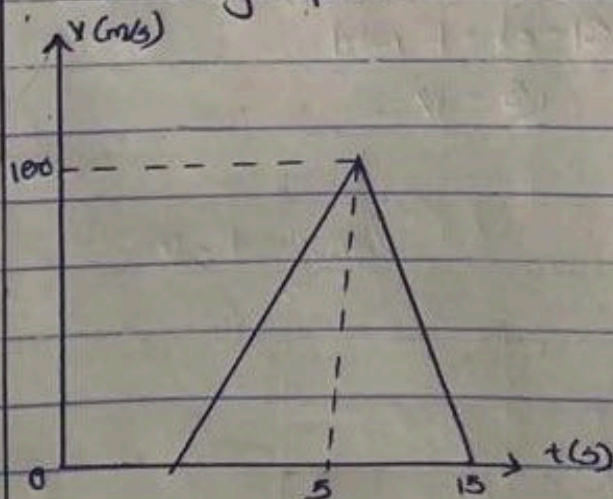
~~$$s - 375 = (-1687.5 + 3375) - (-187.5 + 1125)$$~~

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

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

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

v-t graph



6

