

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

$$v = 1.5t^2$$

at  $t = 6s$

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

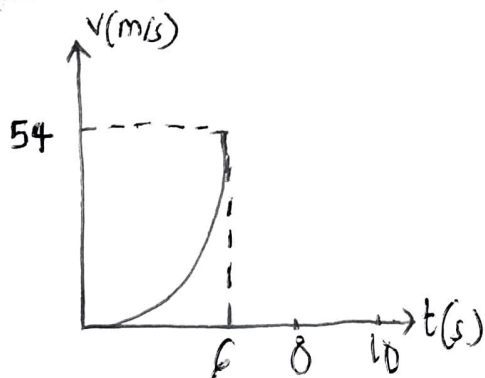
$$= 1.5 \times 36$$

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

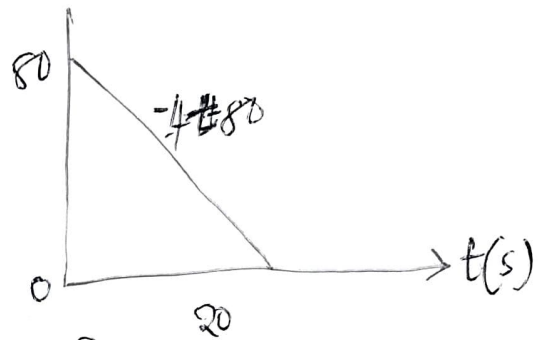
$t = 6s$  -  $10s$ ,  $s = 108$

$$\therefore v = 0$$

$v-t$  graph



2)  $v$  (m/s)



i)  $S = \int v dt$

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

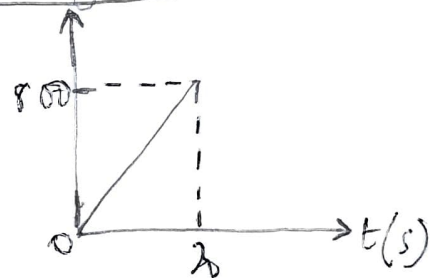
$$S = -2t^2 + 80t$$

at  $t = 20s$

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

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

$S-t$  graph



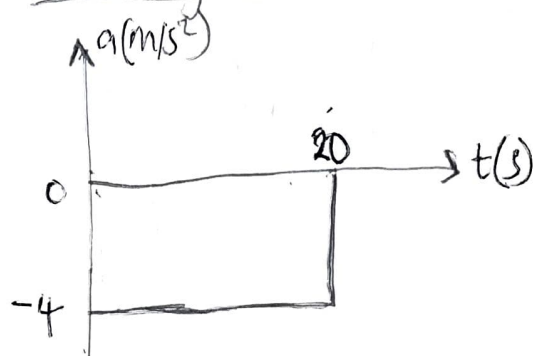
ii)

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

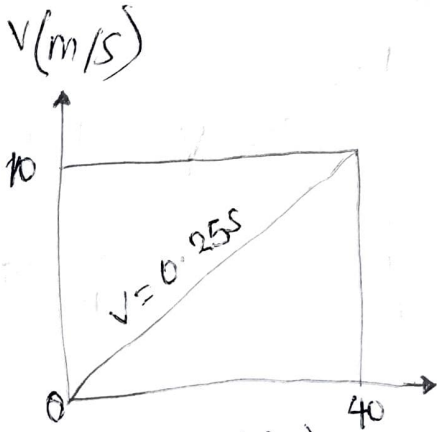
$$\therefore a = -4 \text{ m/s}^2$$

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

$a-t$  graph



3)



$$a = \left( \frac{dv}{dt} \right)_v$$

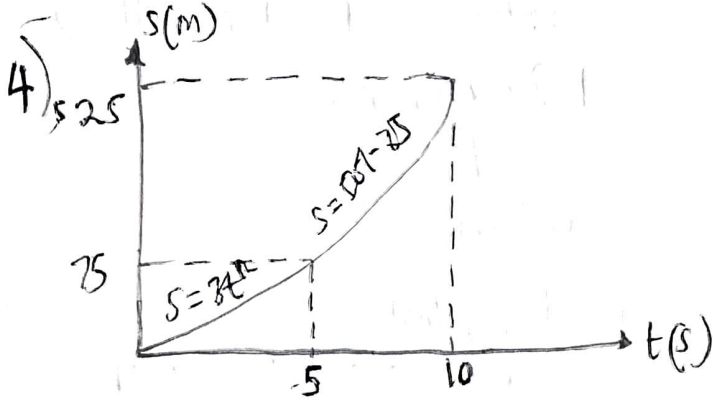
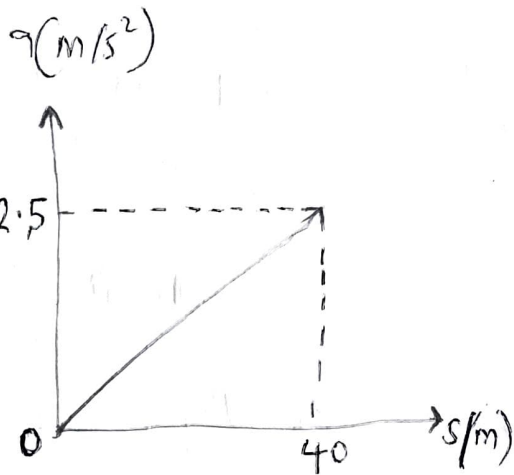
$$v = 0.25s$$

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

$$a = 10 \times 0.25$$

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

a-s graph



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

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

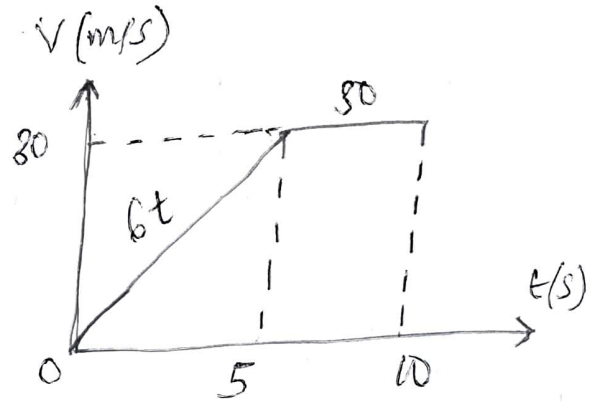
$$v = 6t = 6 \times 5 = 30 \text{ m/s}$$

$$\text{at } t = 10s$$

$$v = 6 \times 10$$

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

v-t graph



i)

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

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

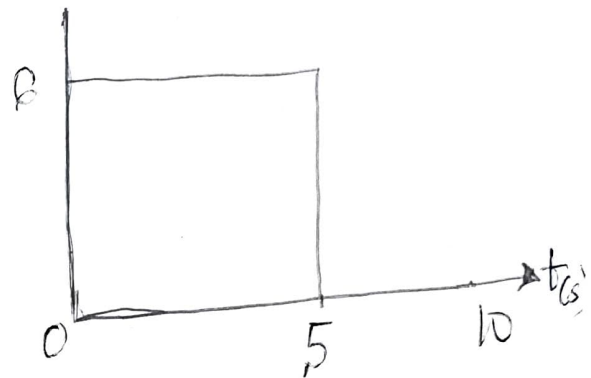
$$a = 6 \text{ m/s}^2$$

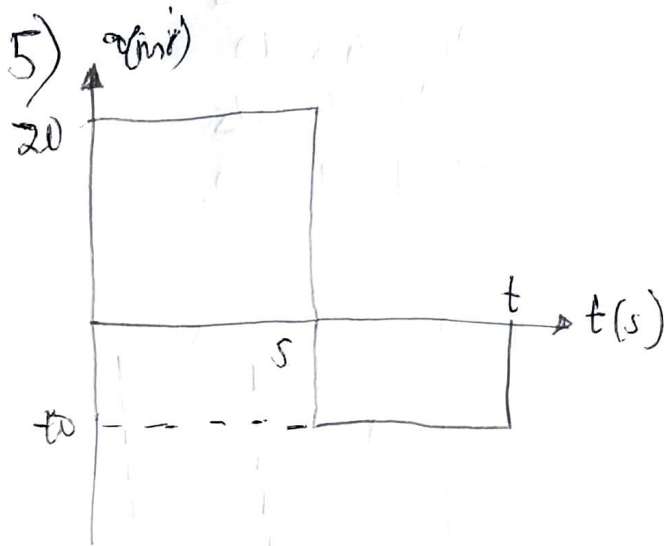
$$\text{at } t = 10s$$

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

a-t graph

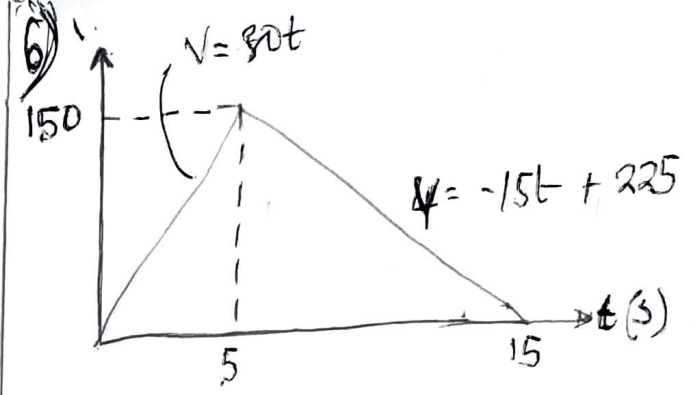
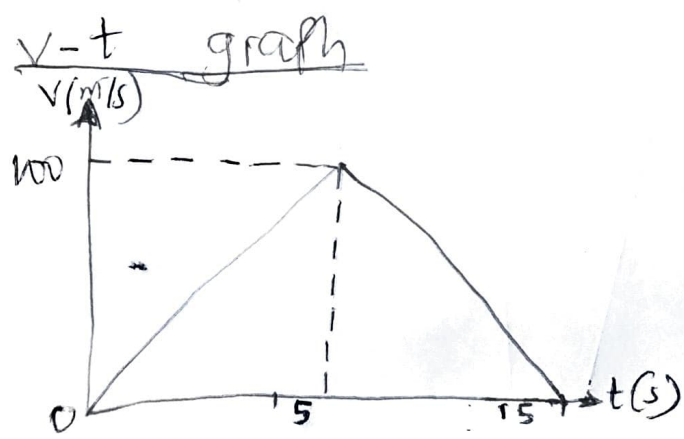
a (m/s<sup>2</sup>)





i)  $V = \int a dt$   
 $V = \int 20 dt$   
 $V = 20t$   
 at  $t = 5s$   
 $V = 20 \times 5 = 100 m/s$   
 $5s < t \leq 15$

$\int_{100}^V dv = \int_5^t -10 dt$   
 $V - 100 = -10t \Big|_5^t$   
 $V - 100 = -10t + 50$   
 $V - 100 = -10t + 50$   
 at  $t = 15$   $V = 0$   
 0 -



$0 \leq t \leq 5$   
 $V = 30t$   
 $\int_0^5 ds = \int_0^5 30t dt$   
 $S = 15t^2 \Big|_0^5$   
 $S = 15(5)^2 - 15(0)^2$   
 $S = 15 \times 25 = 375m$

$5 \leq t \leq 15$   
 $V = -15t + 225$   
 $\int_{375}^S ds = \int_5^{15} (-15t + 225) dt$   
 $S - 375 = -\frac{15t^2}{2} + 225t \Big|_5^{15}$   
 $S - 375 = \left[ -\frac{15(15)^2}{2} + 225(15) \right] - \left[ -\frac{15(5)^2}{2} + 225(5) \right]$   
 $S - 375 = \left[ -\frac{15 \times 225}{2} + 3375 \right] - \left[ -\frac{15 \times 25}{2} + 1125 \right]$   
 $S - 375 = (-1687.5 + 3375) - (-187.5 + 1125)$   
 $S - 375 = 1687.5 - 937.5$   
 $S - 375 = 750$   
 $S = 375 + 750$   
 $S = 1125m$

