

$$1) s = 0.5t^3 \text{ m}$$

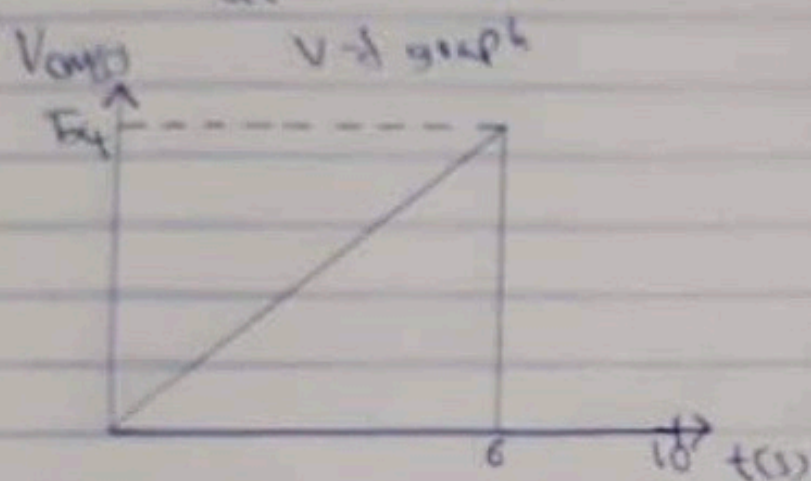
$$v = \frac{ds}{dt} = 1.5t^2 \text{ m/s}$$

$$\text{(a) } t = 6$$

$$v = 1.5(6)^2 = 54 \text{ m/s}$$

$$s_2 = 108$$

$$v = \frac{ds}{dt}; v = 0 \text{ m/s}$$



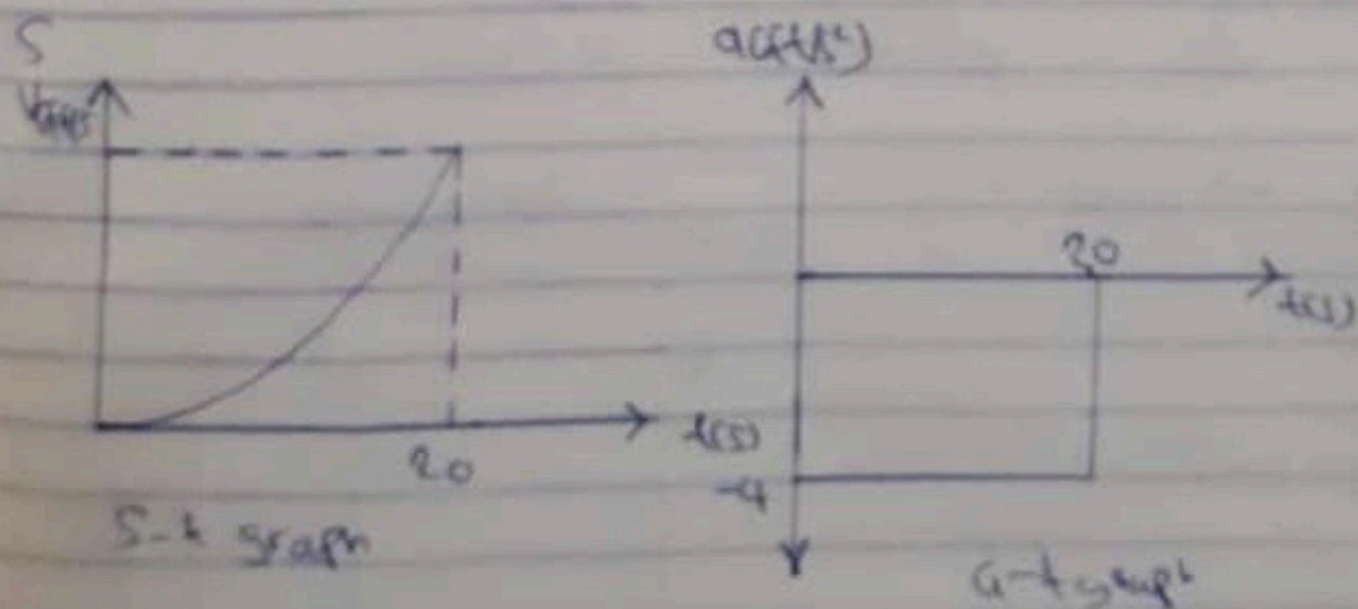
$$2) v = -4t + 80$$

$$a = \frac{dv}{dt} = -4 \text{ m/s}^2; \text{ @ } t = 20 \quad a = 4 \text{ m/s}^2$$

$$s = \int v dt; \int_0^{20} (-2t^2 + 80t)$$

$$s = (-2(20)^2 + 80(20)) - (-2(0)^2 + 80(0))$$

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



$$3 \quad v = 0.25s$$

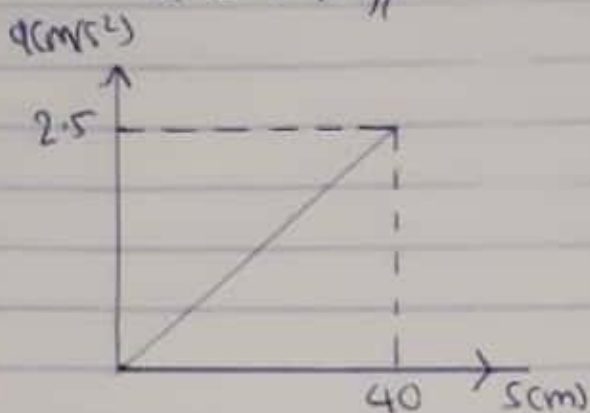
$$a = v \left(\frac{dv}{ds} \right) ; a = 0.25s (0.25)$$

$$a = (0.0625s) \text{ m/s}^2$$

$$\textcircled{a} \quad s = 40 \text{ m}$$

$$\textcircled{a} \quad a = (0.0625(40))$$

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



$$4 \quad s = 3t^2 ; s = 30t - 75$$

$$v = \frac{ds}{dt} ; 6t ; v = \frac{ds}{dt} = 30 \text{ m/s}$$

$$\therefore \textcircled{a} \quad t = 5$$

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

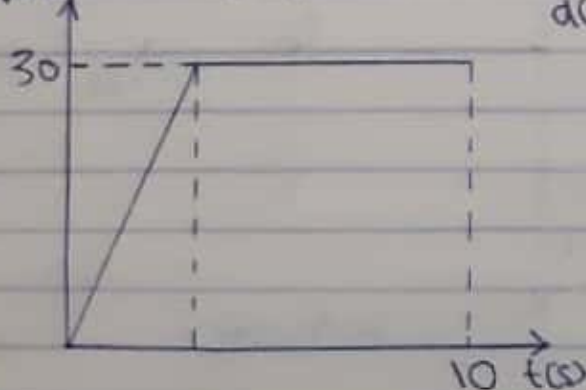
$$v_1 = 6(5) = 30 \text{ m/s}$$

$$a = \frac{dv}{dt} ; \therefore v = 6t ; v = 30 \text{ m/s}^2$$

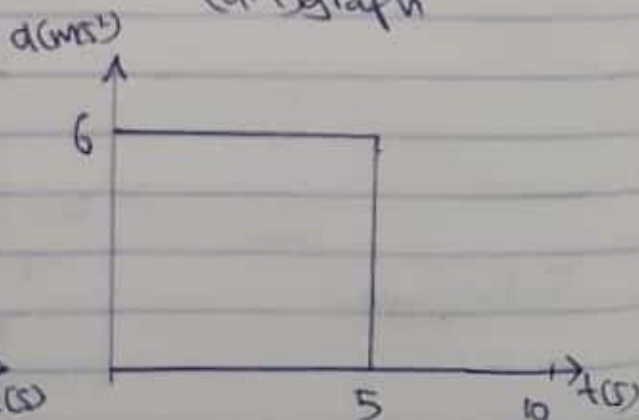
$$a = 6 \text{ m/s}^2$$

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

V-t graph



a-t graph



5 $a = 20 \text{ m/s}^2$ $a = -10 \text{ m/s}^2$
 $\int dv = \int a \cdot dt$
 $\int_0^v dv = \int_0^t 20 \cdot dt$

$v = 20t$
 @ $t = 5 \text{ s}$

$v = 100 \text{ m/s}$
 $\int_{100}^v dv = \int_5^t -10 \cdot dt$

$v - 100 = -10(t - 5)$

$v - 100 = -10t + 50$

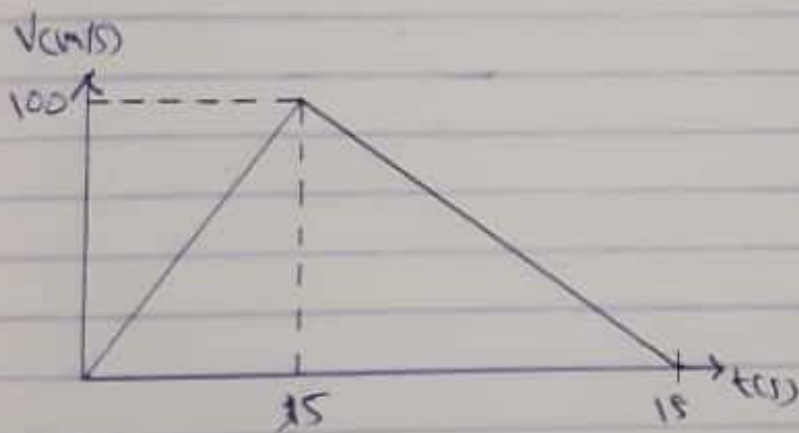
$v = (-10t + 150) \text{ m/s}$

@ $v = 0$

$0 = -10t + 150$

$-150 = -10t$

$t = 15 \text{ s}$ [Time for car to come to rest]



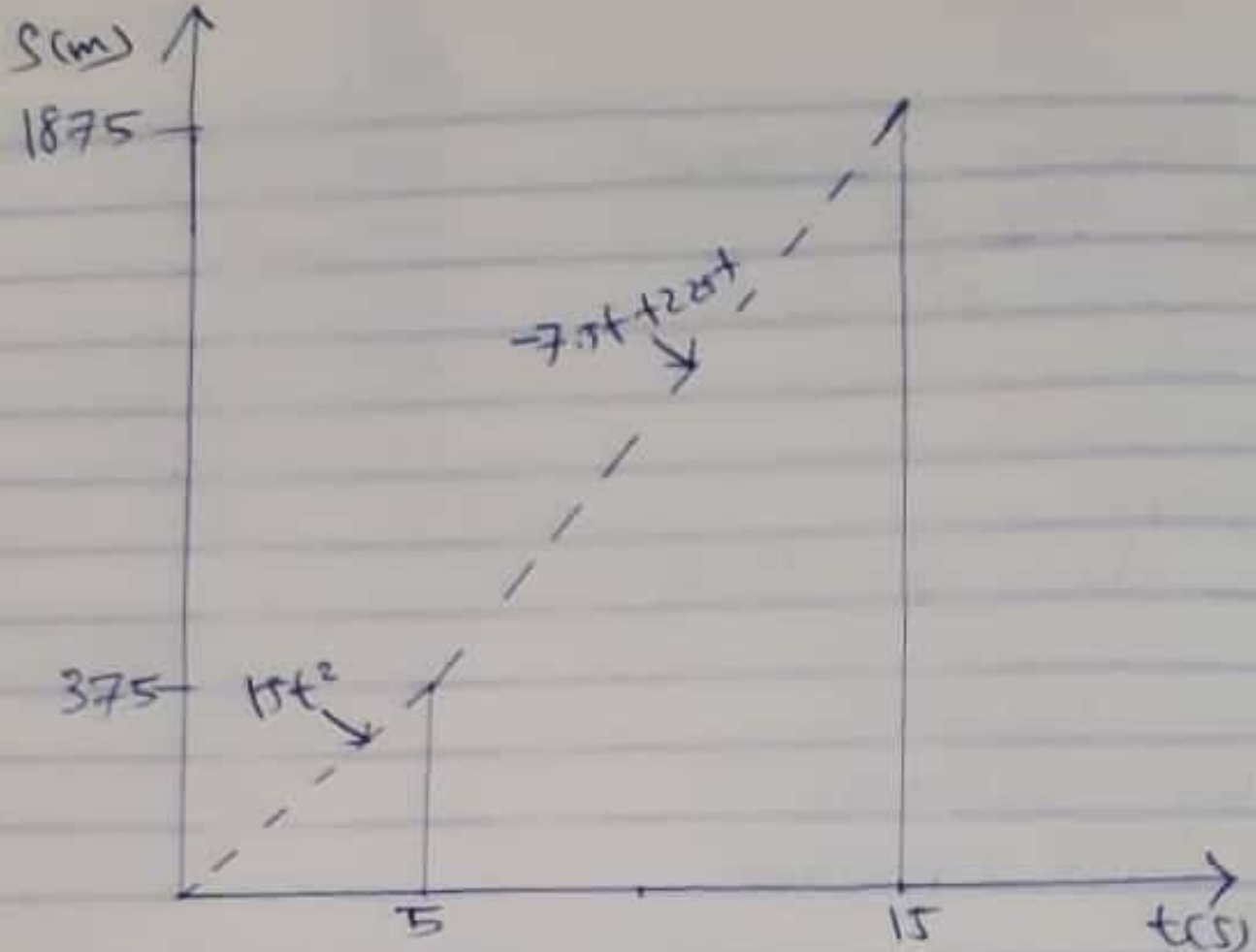
6 $v = 30t$
 $s = \int v dt = (15t^2)$

@ $t = 5$
 $= 15(5)^2$
 $= 375 \text{ m}$

$v = -15t + 225$
 $s = \int v dt = -7.5t^2 + 225t$

@ $t = t_2 - t_1 = 15 - 5 = 10$
 @ $t = 10$
 $-7.5(10)^2 + (225)(10)$
 $= 1500 \text{ m}$

∴ total distance travelled
 $= 375 + 1500 = 1875 \text{ m}$



S-t graph