

LABORATORY PROSER SEROMU
 19/ENG01/018
 CHEMICAL ENGINEERING
~~MECHANICAL ENGINEERING~~ MECHANICS

1) $S = 0.5t^2 \text{ m}$

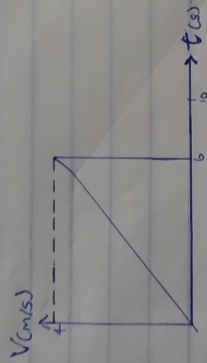
$V = \frac{ds}{dt} = 1.5t \text{ m/s}$

$t = 6$

$V = 1.5(6) = 54 \text{ m/s}$

$S = 108$

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



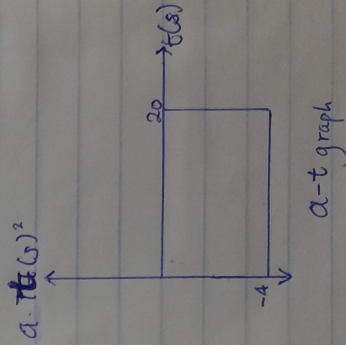
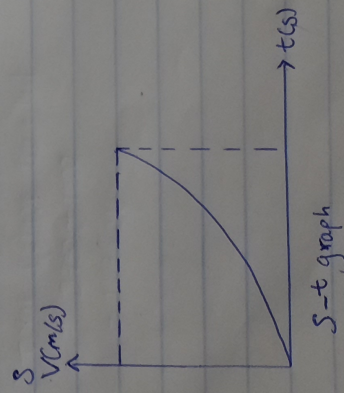
2) $V = -4t + 80$

$a = \frac{dv}{dt} = -4 \text{ m/s}^2$

$t = 80, a = 4 \text{ m/s}^2$

$S = \int v dt = (-2t^2 + 80t)$

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



$$3) V = 0.255$$

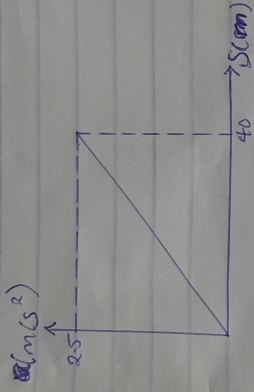
$$a = V \left(\frac{dv}{ds} \right) \int a = 0.255 (0.25)$$

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

$$\textcircled{a} \int = 40 \text{ m}$$

$$a = (0.0625 \times 40)$$

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



$$4) S = 3t^2, \quad S = 30t - 7t$$

$$V = \frac{dS}{dt}; \quad 6t, \quad V = \frac{dS}{dt} = 30 \text{ m/s}$$

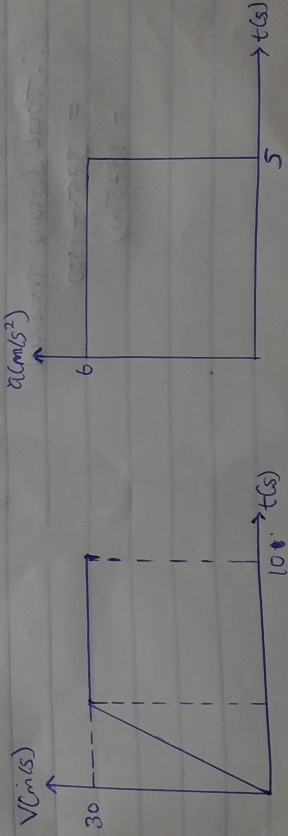
$$\textcircled{a} t = 5, \quad V_2 = 30 \text{ m/s}$$

$$V_1 = 6(5) = 30 \text{ m/s}$$

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

$$V = 6t, \quad V = 30 \text{ m/s}^2$$

$$a = 6 \text{ m/s}^2, \quad a = 0 \text{ m/s}^2$$



V-t graph

$$5) a = 20 \text{ m/s}^2 \quad a = -10 \text{ m/s}^2$$

$$\int dv \int a \cdot dt$$

$$\int_0^v dv = \int_0^t 20 \cdot dt$$

$$\text{a) } t = 20t$$

$$v = 100 \text{ m/s}$$

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

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

$$v - 100 = -10t + 50$$

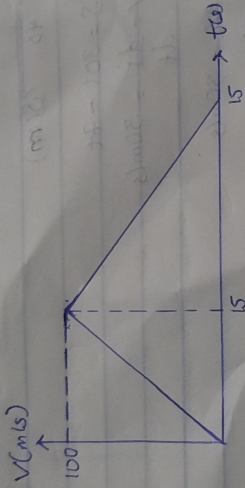
$$v = (-10t + 150) \text{ m/s}$$

$$\text{b) } v = 0$$

$$0 = -10t + 150$$

$$-150 = -10t$$

$$t = 15 \text{ s}$$



$$6) v = 30t$$

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

$$\text{a) } t = 5$$

$$= (15(5))^2$$

$$= 375 \text{ m}$$

$$v = -15t + 225t$$

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

$$\text{a) } t = t_2 - t_1 = 15 - 5 = 10$$

$$\text{b) } t = 10$$

$$-7.5(10)^2 + (225)(10)$$

$$= 1500 \text{ m}$$

\therefore Total distance travelled

$$= 375 + 1500$$

$$= 1875 \text{ m}$$