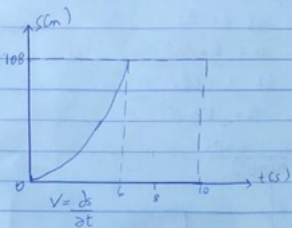


CIVIL ENGINEERING



$$V = 1.5t^2$$

at $t = 6s$

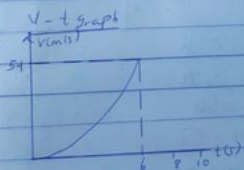
$$V = 1.5 \times 6^2$$

$$V = 1.5 \times 36$$

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

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

$$V = 0$$

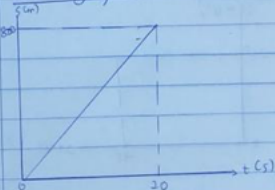


$$S = -2(20)^2 + 80(20)$$

$$S = 1600m - 800 + 1600$$

$$S = 800m$$

s-t graph:



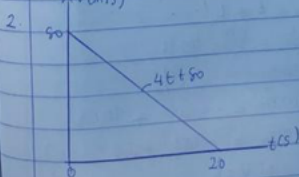
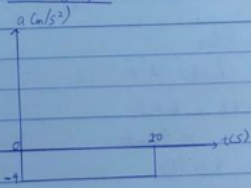
ii) Acceleration

$$a = dv/dt$$

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

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

a-t graph

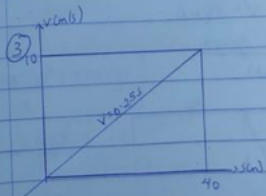


$$s = \int v dt$$

$$s = \int (-4t + 90) dt$$

$$s = -2t^2 + 90t$$

at $t = 20s$



$$a = (dv/ds)v$$

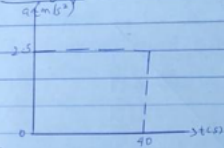
$$v = 0.25s$$

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

$$a = 10 \times 0.25$$

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

a-t graph



$$ii) a = dv/dt$$

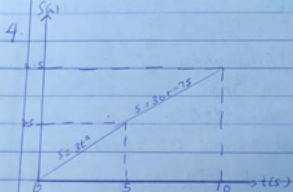
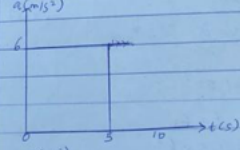
$$\text{at } t = 5s$$

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

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

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

a-t graph



$$i) v = ds/dt$$

$$\text{at } t = 5s \text{ } v = 36^2$$

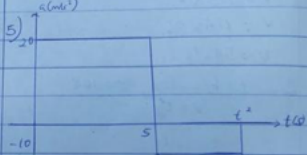
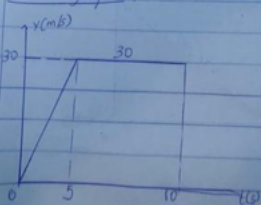
$$v = 6t = 6 \times 5$$

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

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

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

v-t graph



$$i) v = \int a dt$$

$$v = \int 20 dt$$

$$v = 20 \int dt$$

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

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

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

$$\int_{100}^v dv = \int_{5}^{t'} -10 dt$$

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

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

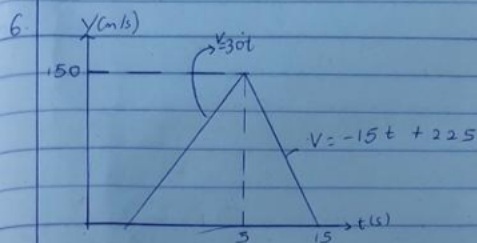
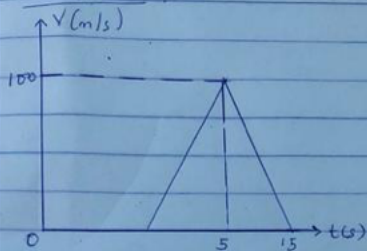
$$\text{at } t', v = 0$$

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

$$-10t' = 150$$

$$t' = 15s$$

V-t graph



$$0 \leq t \leq 5$$

$$v = 30t$$

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

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

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

$$s = 15 \times 25$$

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

$$5 \leq t \leq 15$$

$$v = -15t + 225$$

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

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

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

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

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

$$s - 375 = 750$$

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

Hikmat's assignment