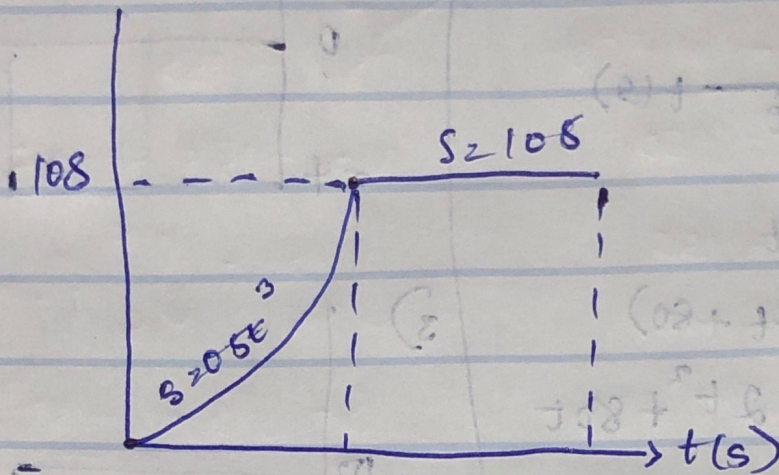


Question No 50

18/EN904/061

Elect/Elect Engr.

1)



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

$$v = 1.5t^2$$

at $t = 6s$

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

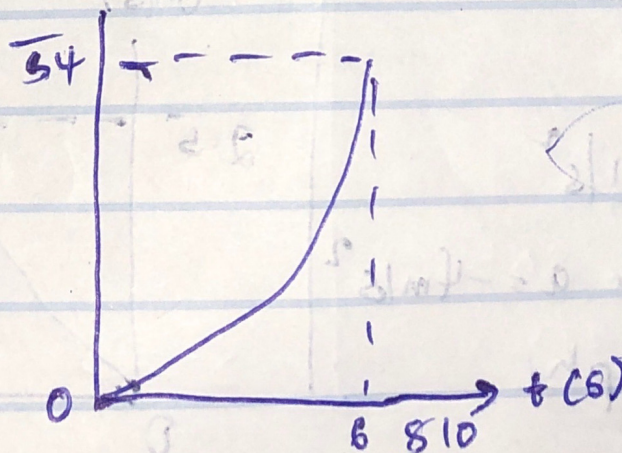
$$v = 1.5 \times 36$$

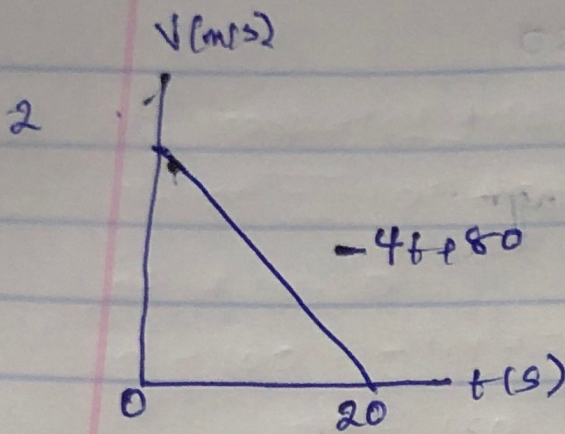
$$v = 54 \text{ m/s}$$

from $t = 6s - 10s$

$$\therefore v = 0$$

v-t graph





$$s = \int v dt$$

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

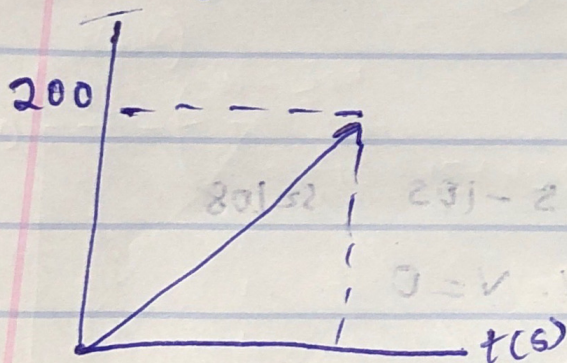
$$s = -2t^2 + 80t$$

at $t = 20 \text{ s}$

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

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

s-t graph



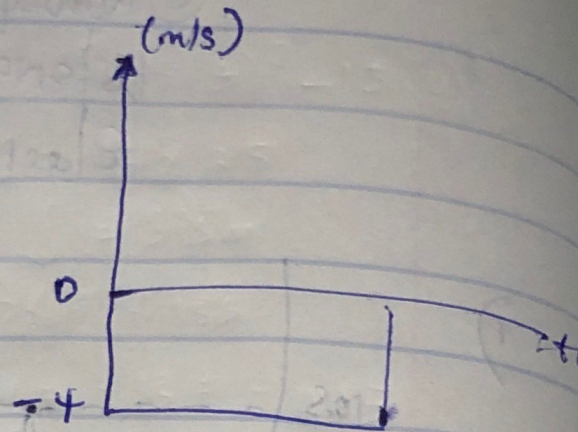
ii acceleration

$$a = dv/dt$$

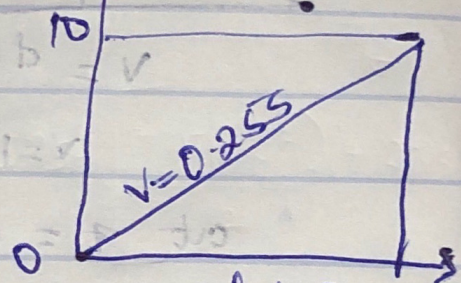
$$\therefore a = -4 \text{ m/s}^2$$

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

a-t graph



3)



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

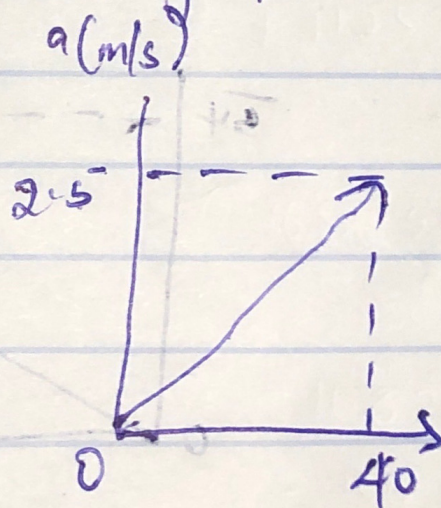
$$v = 0.25s$$

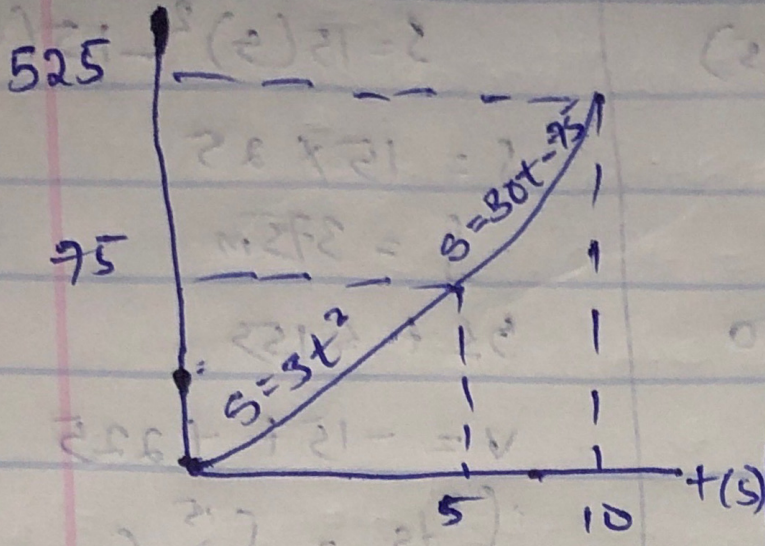
$$a = 10 \times d(0.25s)/ds$$

$$a = 10 \times 0.25$$

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

a-s graph





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

at $t = 5s$

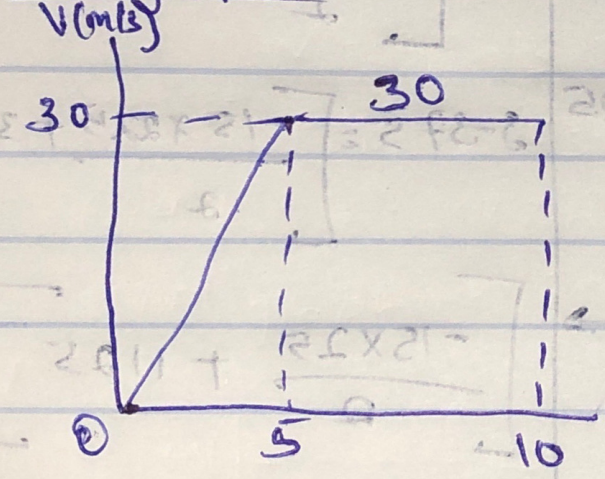
$$v = 6t = 6 \times 5$$

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

at $t = 10s$

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

V-t graph



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

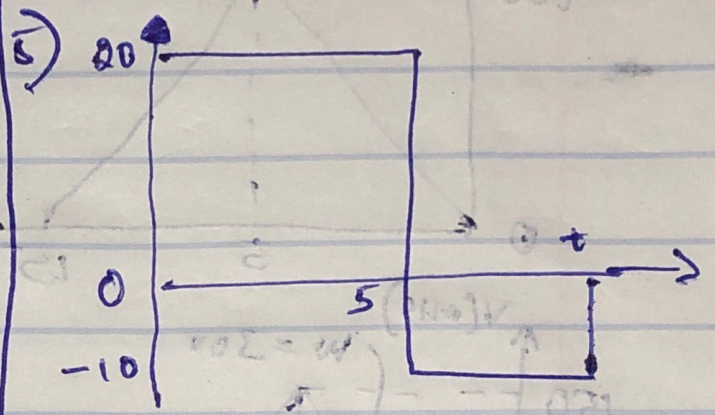
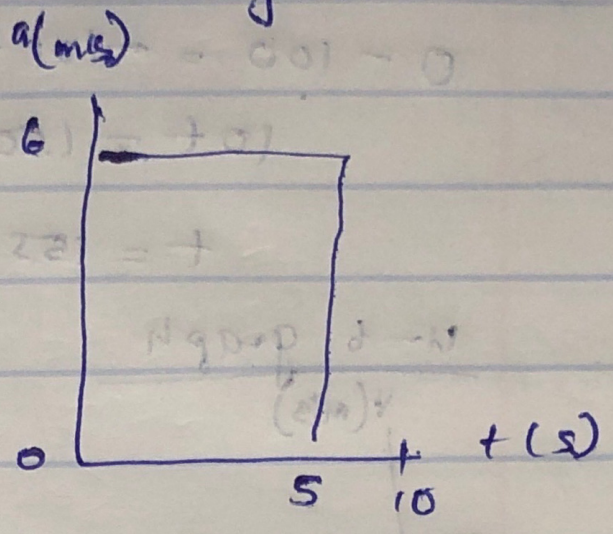
at $t = 5s$

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

$$at = t = 10s$$

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

a-t graph



$$v = \int a dt$$

$$v = \int 20 dt$$

$$v = 20t$$

at $t = 5s$

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

$$5t \leq t \leq t$$

$$\int_0^v dv = \int_5^t -10 dt$$

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

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

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

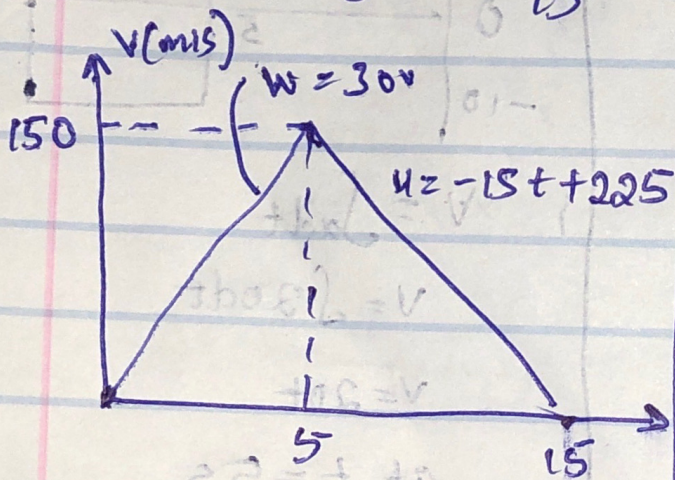
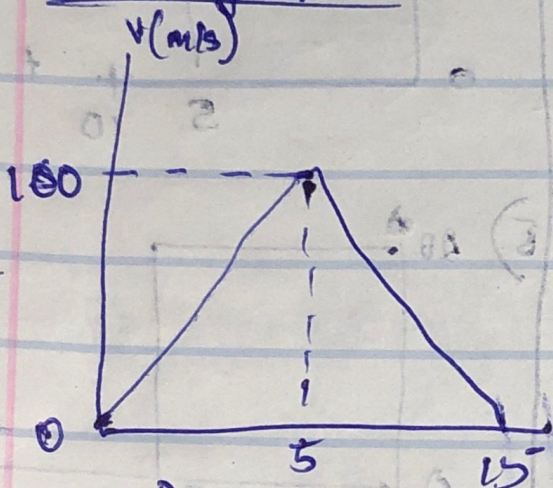
$$at + v = 0$$

$$0 - 100 = -10t + 50$$

$$10t = 150$$

$$t = 15s$$

u-t graph



$$0 \leq t \leq 5$$

$$v = 30t$$

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

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

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

$$s = 15 \times 25$$

$$s = 375m$$

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

$$v = -15t + 225$$

$$\int_{375}^s ds = \int_{5}^{15} (-15t + 225) dt$$

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

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

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

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

$$\left[\frac{-15 \times 25}{2} + 1125 \right]$$

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

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

$$s - 375 = 750$$

$$s = 1125$$

S-t graph

