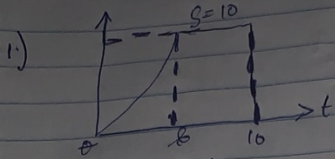


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 COMPUTER ENGINEERING
 18/EN02/013



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

$$v = 1.5t^2$$

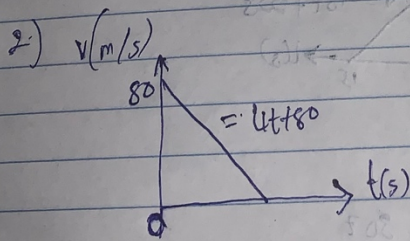
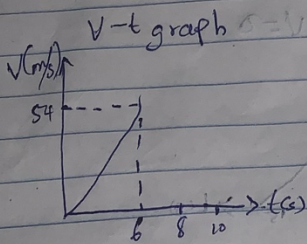
at $t = 6s$

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

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

$$t = 6s - 10s \quad s = 10s$$

$$\therefore v = 0$$



1.) $S = \int v dt$

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

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

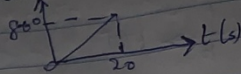
at $t = 20s$

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

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

S

S-t graph

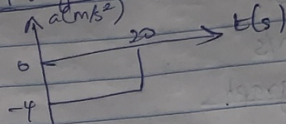


ii) $a = \frac{dv}{dt}$

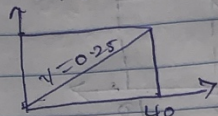
$$\therefore a = -4 \text{ m/s}^2$$

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

a-t graph



v(m/s)



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

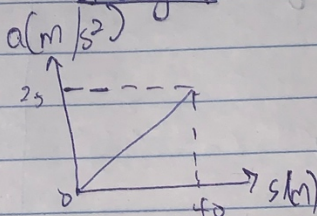
$$v = 0.25s$$

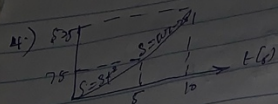
$$a = 10 \times \frac{d(0.25s)}{ds}$$

$$a = 10 \times 0.25$$

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

a-s graph

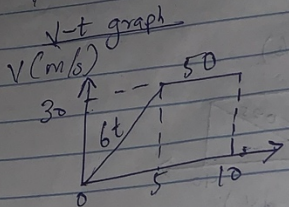




$$v = \frac{ds}{dt}$$

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

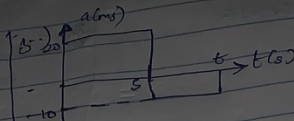
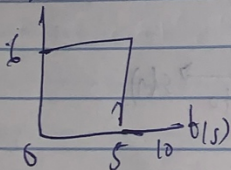
at $t=10s$
 $v = 6 \times 10$
 $v = 30 \text{ m/s}$



ii) $a = \frac{dv}{dt}$
 at $t=5s$
 $a = 6 \text{ m/s}^2$
 at $t=10s$
 $a = 0 \text{ m/s}^2$

a-t graph

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



i) $v = \int a dt$

$$v = \int 20 dt$$

$$v = 20t$$

at $t=5s$

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

$5s < t < 10s$

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

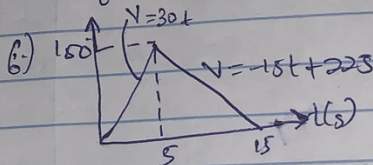
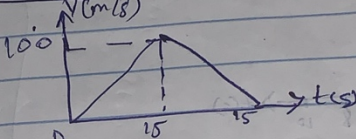
$$v - 100 = -10t + 50$$

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

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

at $t=10s$ $v=0$

v-t graph



$0 \leq t \leq 5s$

$$v \leq 30t$$

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

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

$$s = 15 \times 25 = 375 \text{ m}$$

$5 \leq t \leq 15s$

$$v = -15t + 225$$

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

$$s - 375 = \frac{-15t^2 + 225t}{2} \Big|_0^5$$

$$s - 375 = \left[\frac{-15(5)^2 + 225(5)}{2} \right] - \left[\frac{-15(0)^2 + 225(0)}{2} \right]$$

$$s - 375 = \left[\frac{-15 \times 25 + 225 \times 5}{2} \right] - \left[\frac{-15 \times 0 + 1125}{2} \right]$$

$$s - 375 = [-1687.5 + 3375] - [-1125]$$

$$s - 375 = 1687.5 = 937.5$$

$$s = 375 + 937.5$$

$$s = 1312.5 \text{ m}$$

s-t graph

