

CHIORE VICTOR U.P.

18/ENG02/031

COMPUTER ENGINEERING

ENG 234 ASSIGNMENT

1.  $S_1 = 0.5t^3 \text{ m}$ ,  $S_2 = 108 \text{ m}$

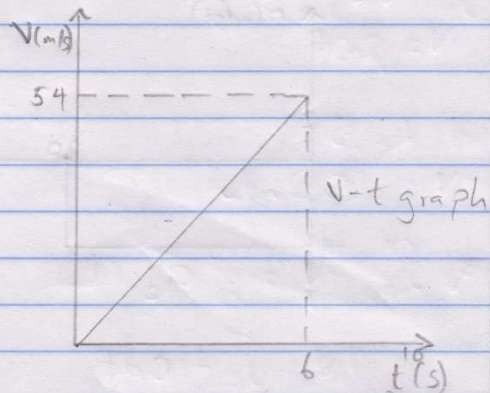
$$V_1 = \frac{ds}{dt} = 1.5t^2$$

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

$$V_2 = \frac{ds}{dt} = 0$$

from 6 to 10 seconds

$$V_2 = 0$$



2.  $V = -4t + 80$

Integrating, ~~with~~

$$\int_0^{20} -4t + 80 dt$$

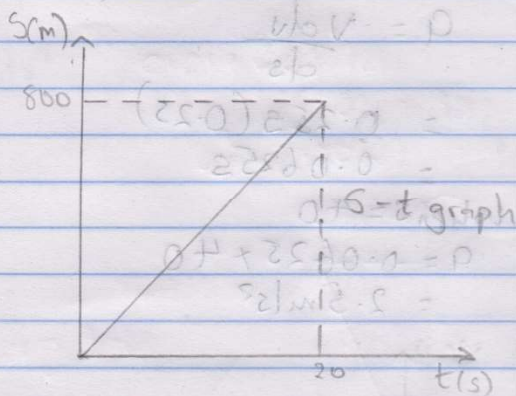
$$= \left[ -\frac{4t^2}{2} + 80t \right]_0^{20}$$

$$S = \left[ -2t^2 + 80t \right]_0^{20}$$

$$= \left[ -2(20)^2 + 80(20) \right] - \left[ -2(0)^2 + 80(0) \right]$$

$$= -800 + 1600$$

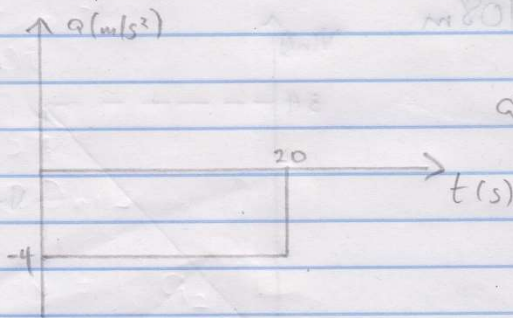
$$= 800 \text{ m}$$



Recall that  $v = -(4t + 80) \text{ m/s}$

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

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



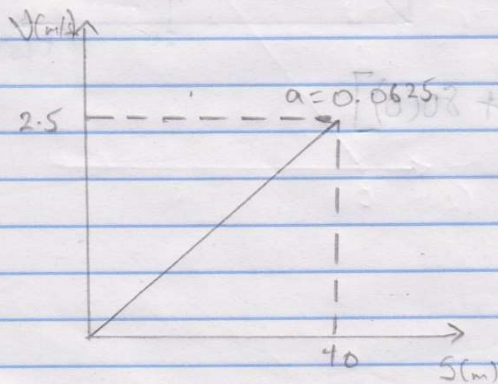
3.  $v = (0.25s) \text{ m/s}$

$a = \frac{dv}{ds}$ , It can also be written in this case as

$$\begin{aligned} a &= v \frac{dv}{ds} \\ &= 0.25s(0.25) \\ &= 0.0625s \end{aligned}$$

when  $s = 40$

$$\begin{aligned} a &= 0.0625 \times 40 \\ &= 2.5 \text{ m/s}^2 \end{aligned}$$



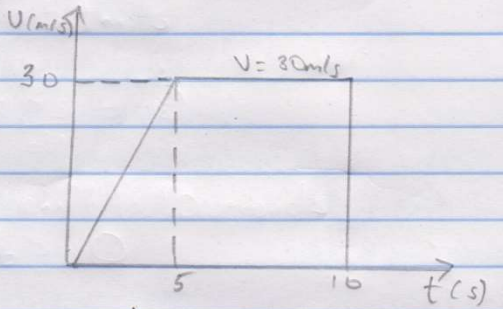
4.  $S_2 = (30t - 7t^2)$ ,  $S_1 = 3t^3$

$V_2 = \frac{dS}{dt} = 30 - 14t$

$V_1 = \frac{dS}{dt} = 9t^2$

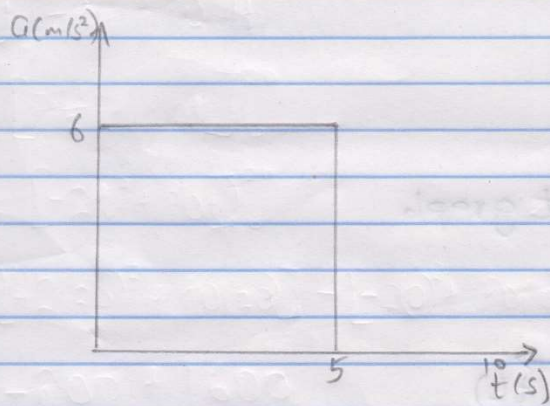
when  $t = 5$  seconds

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



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

$a_1 = 6 \text{ m/s}^2$      $a_2 = 0 \text{ m/s}^2$



$$5. a_1 = 20 \text{ m/s}^2 \quad a_2 = -10 \text{ m/s}^2 \quad v = 0 \quad (25 - 108) = \dots$$

$$\int dv = \int a_1 \cdot dt$$

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

$$v = 20t$$

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

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

$$\int_{100}^v dv = \int_5^t a_2 dt$$

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

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

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

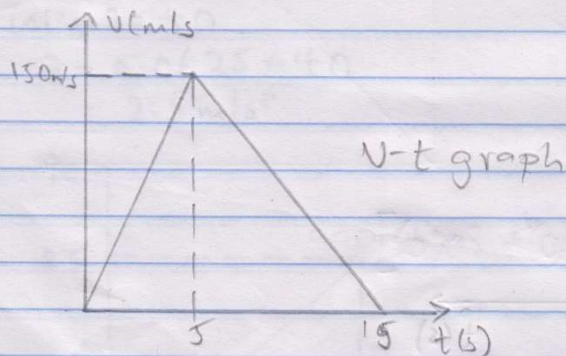
$$v = -10t + 50 + 100$$

$$\text{Since } v = 0$$

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

$$10t = 150$$

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



$$V = 30t$$

$$\int ds = \int v dt$$

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

$$s = 15t^2$$

$$t = 5s$$

$$\therefore s = 15(5)^2$$

$$= 375 \text{ m}$$

$$V = (-15t + 225)$$

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

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

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

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

$$s - 375 = ~~75~~ 1687.5 - 937.5$$

$$s - 375 = 750$$

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

