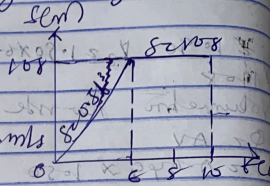


Mechanics Assignment

Name: Nnamak Oynye
 Mat No: 08/EN408/01
 Dept: Biomedical Engineering

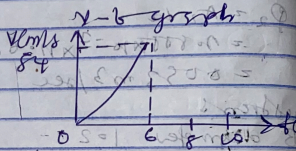
1. $0 \leq t \leq 6$ secs
 $s = 0.5t^2$
 $v = \frac{ds}{dt} = t$



$\therefore v = 0.5(6)^2 = 5.4 \text{ m/s}$

$6 \leq t \leq 10$ secs

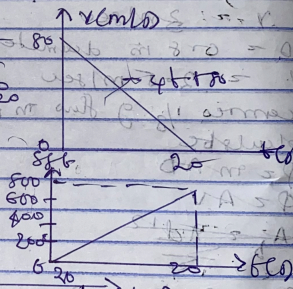
$s = 10.8 - 0.5t^2$
 $v = \frac{ds}{dt} = -t$



2) $v = -4t + 80$

$v = \frac{ds}{dt} \Rightarrow ds = v dt = (-4t + 80) dt$

$\int ds = \int (-4t + 80) dt$
 $s = -2t^2 + 80t$
 $s = -2(20)^2 + 80(20)$
 $s = 800 \text{ ft}$

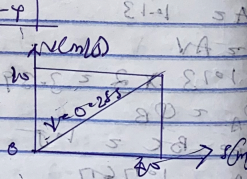


Acceleration

$a = \frac{dv}{dt} = -4$

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

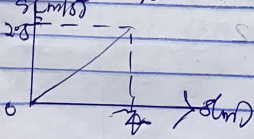
3) $v = (0.25t^2) \text{ m/s}$
 $a = \frac{dv}{dt} = 0.5t$
 $a = (0.0625t) \text{ m/s}^2$



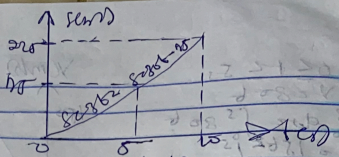
At $s = 40 \text{ m}$

$s = 0.0625t^2 \times 40 = 2.5 \text{ m/s}^2$

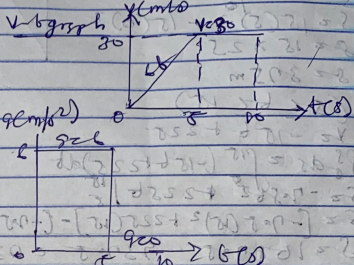
or s graph



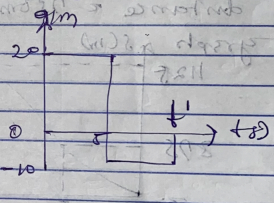
$\int v \cdot ds dt$
 $st = 6 = 8s$
 $v = 6b = 6 \times 8$
 $200 + 20 = 200 \text{ m/s}$
 $st = 6 = 10s$
 $v = 30 \text{ m/s}$



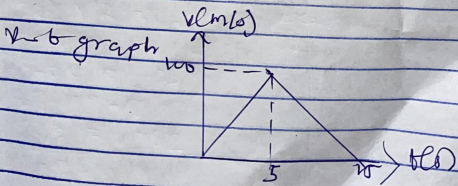
1) $sz = dv/dt$
 $9 = b = 3s$
 $9 = cb \text{ m/s}^2$
 $st = 6 = 10s$
 $s = 20 \text{ m/s}$



2) $v = fs dt$
 $v = f \cdot 6 dt$
 $v = 20t$
 $st = 6 = 5s$



$v = 20 \times 5 = 100 \text{ m/s}$
 $5s < b < b'$
 $\int_{5s}^{b'} dv = \int_{5s}^{b'} -10 dt$
 $v - 100 = -10b' + 10(5)$
 $v - 100 = -10b' + 50$
 $st = b' = v < 0$
 $5 - 100 = -10t + 50$
 $10t = 150$
 $b = 15s$



$$\textcircled{b} \quad 0 \leq t \leq 5$$

$$v = 280t$$

$$\int_0^5 ds = \int_0^5 280t dt$$

$$s = 1562 \frac{1}{2}$$

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

$$s = 15 \times 25$$

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

$$(5 \leq t \leq 15)$$

$$v = -10t + 220$$

$$\int_5^{15} ds = \int_5^{15} (-10t + 220) dt$$

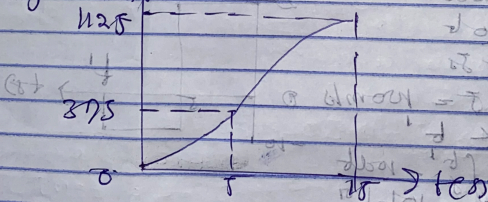
$$s = -7.5t^2 + 225t \Big|_5^{15}$$

$$s = [-7.5(15)^2 + 225(15)] - [-7.5(5)^2 + 225(5)]$$

$$s = 1587.5 - 937.5 = 650 \text{ m}$$

Total distance = $375 \text{ m} + 650 \text{ m} = 1025 \text{ m}$

s-t graph



$$v = 280t$$

$$v = -10t + 220$$

$$0 = v = 280t$$

$$0 = -10t + 220$$

$$10t = 220$$

$$t = 22$$

$$v = 280t$$

$$v = -10t + 220$$