

Dwala Ugochukwu Chimaranda

18/EIOG061045

Mechanical engineering

Eng 234 (Mechanics)

$$s = 0.5t^3$$

$$0 \leq t < 6 \text{ secs}$$

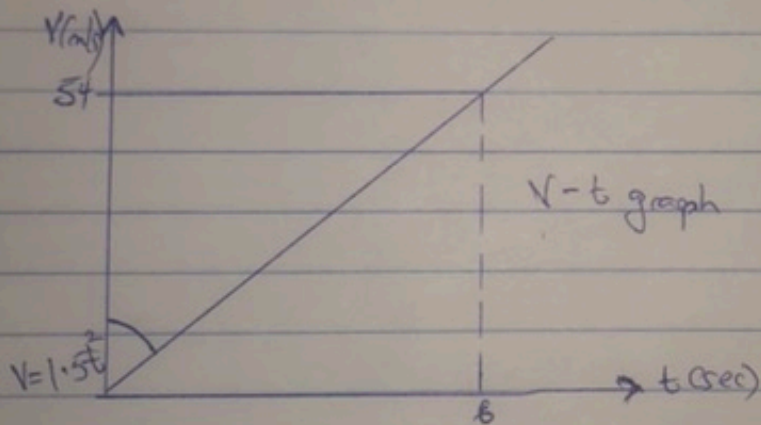
$$v = \frac{ds}{dt} = 1.5t^2 \text{ m/s}$$

$$6 \text{ sec} \cdot v = 1.5(6)^2 = 54 \text{ m/s}$$

$$6 \leq t < 10 \text{ secs}$$

$$s = 108$$

$$v = \frac{ds}{dt} = 0 \text{ m/s}$$



$$v = -4t + 80$$

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

$$s = \int_0^5 (-4t + 80)$$

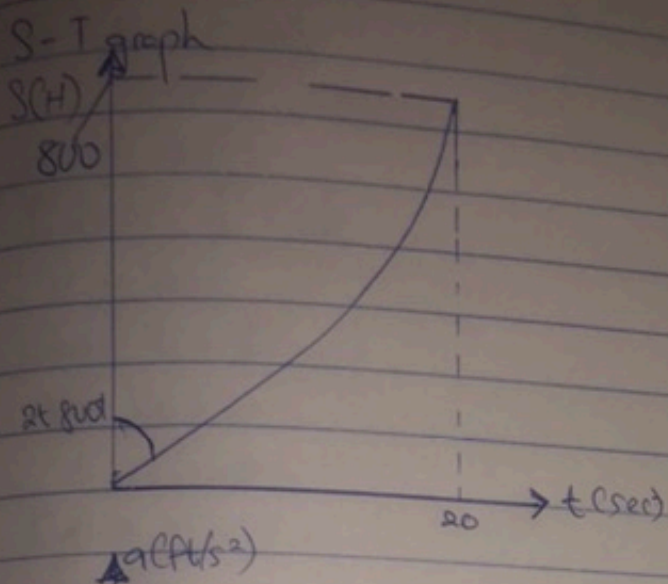
$$s = \left[-2t^2 + 80t \right]_0^{20}$$

$$0 < t < 20 \text{ secs}$$

$$s = \left(-2(20)^2 + 80(20) \right)$$

$$s = -800 + 1600$$

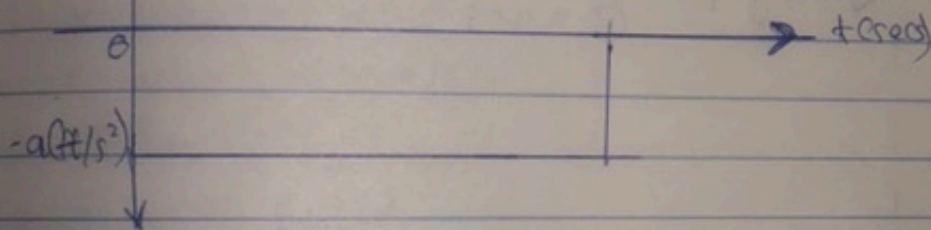
$$s = \underline{800 \text{ ft}}$$



$$v = (-4 + 80) \text{ ft/s}$$

$$0 < t < 20 \text{ s}$$

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



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

$$a ds = v dv$$

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

$$\frac{dv}{ds} = 0.25$$

$$a = (0.25 \text{ s}) (0.25)$$

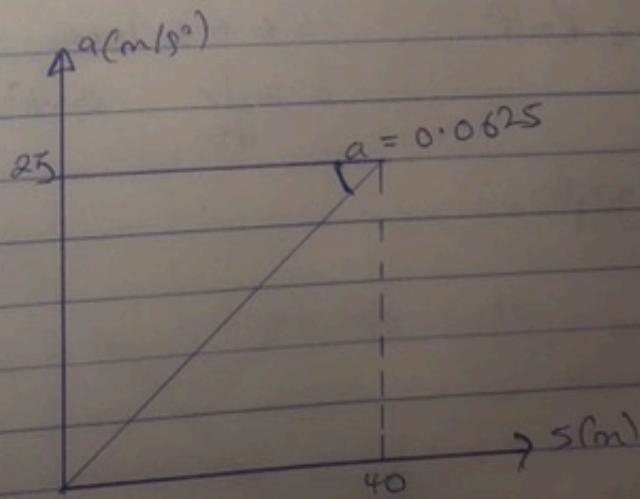
$$a = 0.0625 \text{ s m/s}^2$$

$$\text{At } s = 40 \text{ m}$$

$$a = 0.0625 \times 40$$

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

$$a = \int \text{graph}$$



4) $S = 3t^2$
 $0 < t < 5 \text{ secs}$

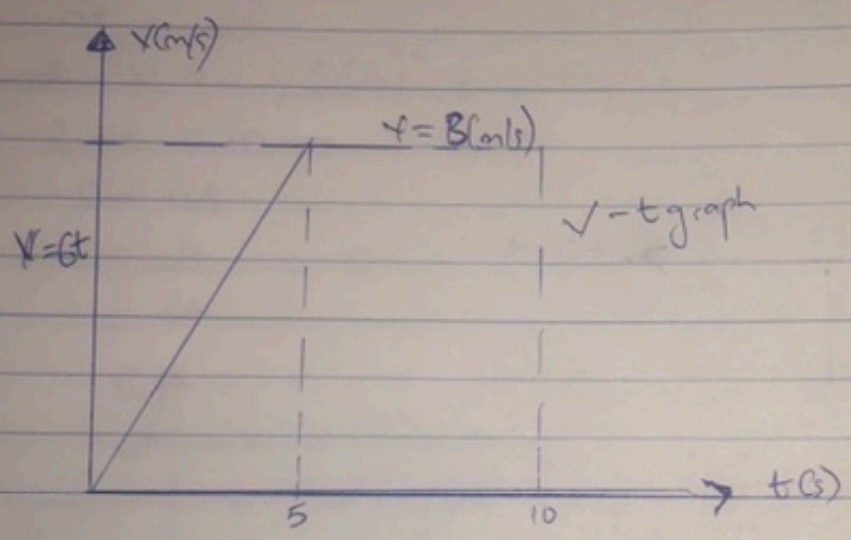
$$v = \frac{ds}{dt} = \frac{6t}{1}$$

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

$$5 \leq t \leq 10 \text{ secs}$$

$$S = 300 - 75$$

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



$$v = 6t \text{ m/s}$$

$$0 \leq t \leq 5 \text{ secs}$$

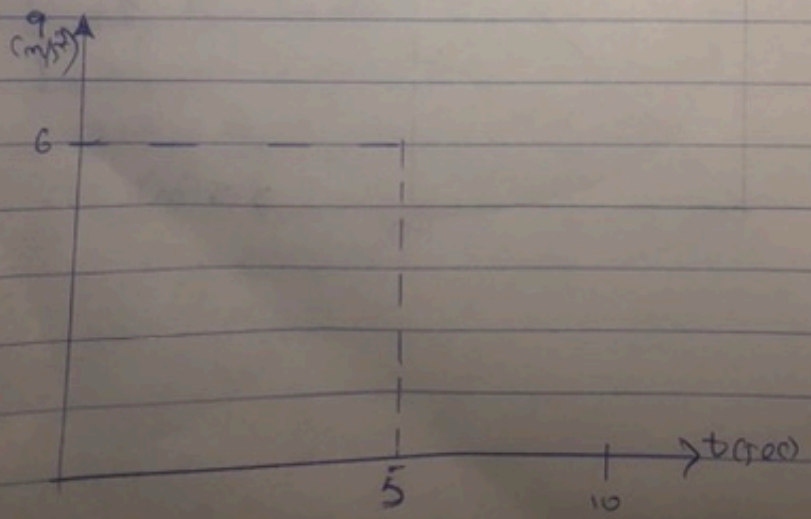
$$a = \frac{dv}{dt} = 6 \text{ m/s}^2$$

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

$$5 \leq t \leq 10 \text{ secs}$$

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

$a-t$ graph



$$5) 0 \leq t \leq 5 \text{ secs}$$

$$a = 20 \text{ m/s}^2$$

$$dv = a dt$$

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

$$v = 20t$$

$$\text{when } t = 5$$

$$v = 20 \times 5$$

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

$$5 < t < 10 \text{ secs}$$

$$a = -10 \text{ m/s}^2$$

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

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

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

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

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

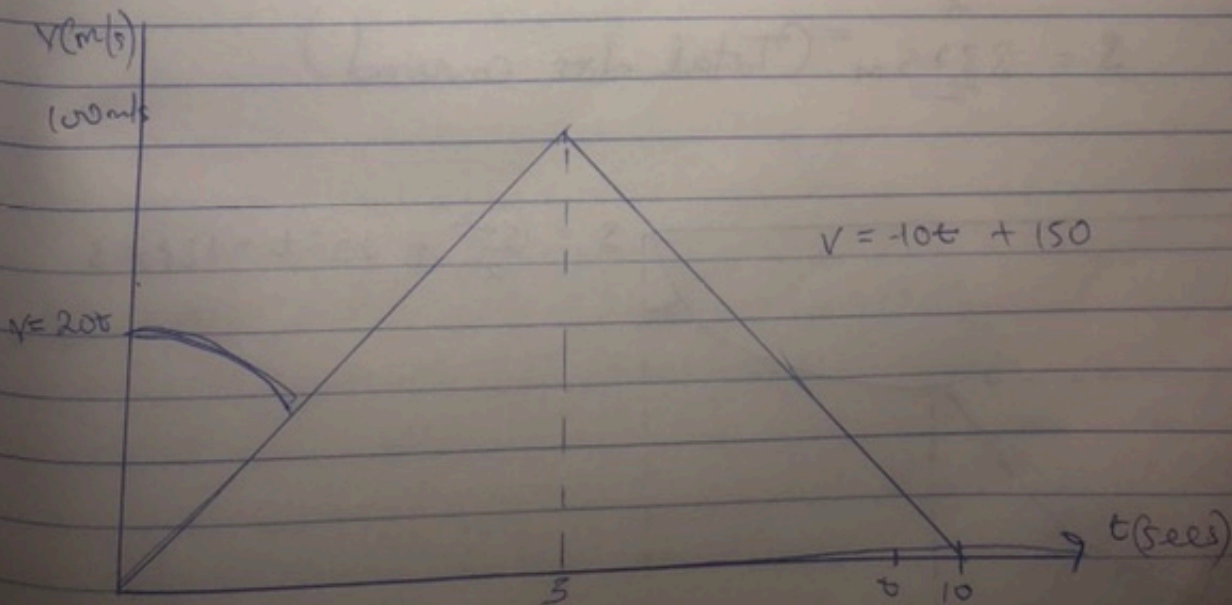
$$0 = -10t + 150$$

$$10t = 150$$

$$t = \frac{150}{10} = 15 \text{ secs}$$

$$5 \leq t < t' = t' = 15 \text{ secs}$$

$$v = -10 \times 15 + 150 = 0 \text{ m/s}$$



1.6) $0 \leq t \leq 5 \text{ sec}$

$0 \leq t \leq 5 \text{ sec}$ $v = 30t$

$$\int_0^5 ds = \int_0^5 v dt$$

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

$$s = 15t^2$$

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

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

$5 \leq t \leq 15 \text{ sec}$ $v = -10t + 225$

$$\int_{375}^s ds = \int_5^t (-10t + 225) dt$$

$$s - 375 = \left[\frac{-10t^2}{2} + 225t \right]_5^t$$

$$s - 375 = \left[\frac{-10t^2}{2} + 225t \right] - \left[\frac{-10(5)^2}{2} + 225(5) \right]$$

$$s - 375 = \frac{-10t^2}{2} + 225t + 1312.5$$

$$s = \frac{-10t^2}{2} + 225t + 1312.5 + 375$$

$$s = \frac{-10t^2}{2} + 225t + 1687.5$$

when $t = 15$

$$s = \frac{-10(15)^2}{2} + 225(15) + 1687.5$$

$$s = \underline{\underline{3375 \text{ m}}} \text{ (Total dist covered)}$$

