

ESSIEN UWANA MFON

18 | EN904/036

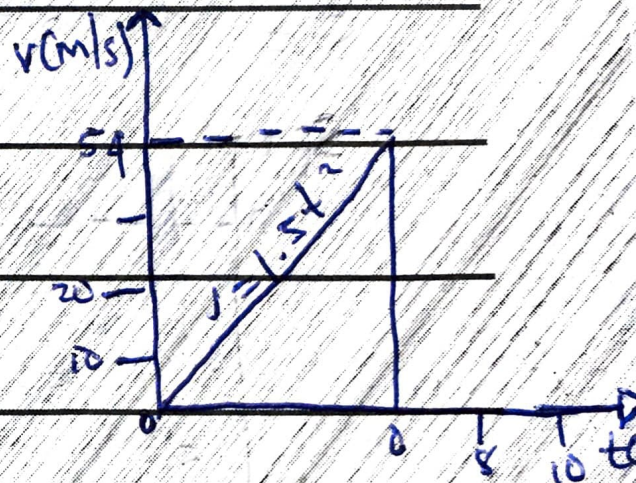
ELECT/ELECT

EN9 234

1. $(0 \leq t \leq 6)$ secs

$$s = 0.5t^3$$

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



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

$(6 \leq t \leq 10)$ secs

$$s = 108$$

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

$$2) v = -4t + 80$$

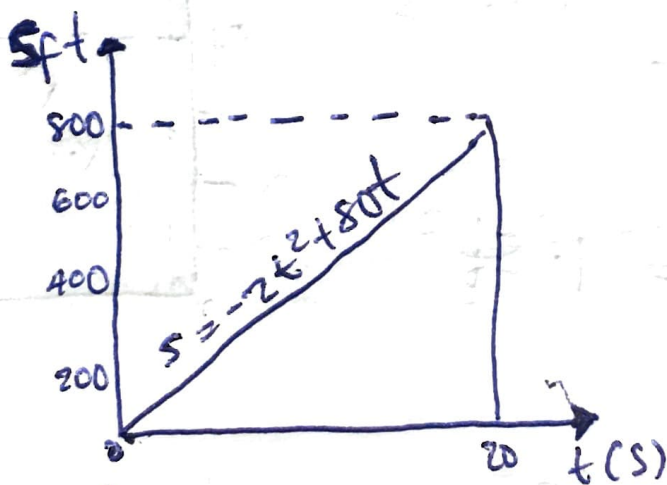
$$v = \frac{\delta s}{\delta t} \quad \delta s = v \delta t$$

$$\int_0^s \delta s = \int_{20}^t (-4t + 80) \delta t$$

$$s \Big|_0^s = -2t^2 + 80t \Big|_{20}^t$$

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

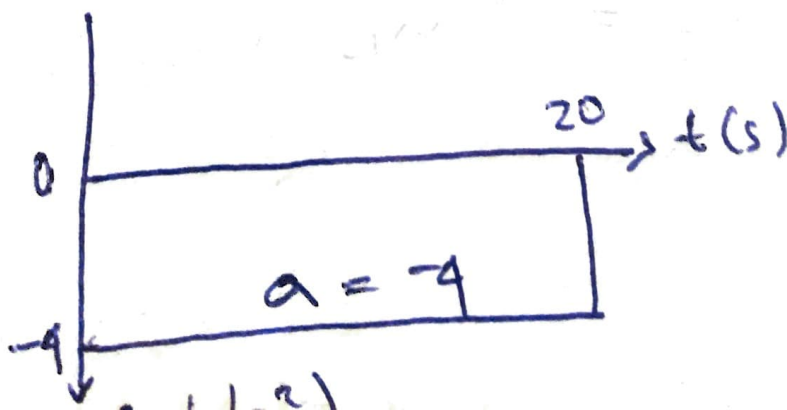
$$s = 800 \text{ ft}$$



Acceleration

$$a = \frac{\delta v}{\delta t} = \frac{\delta}{\delta t} (-4t + 80)$$

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



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

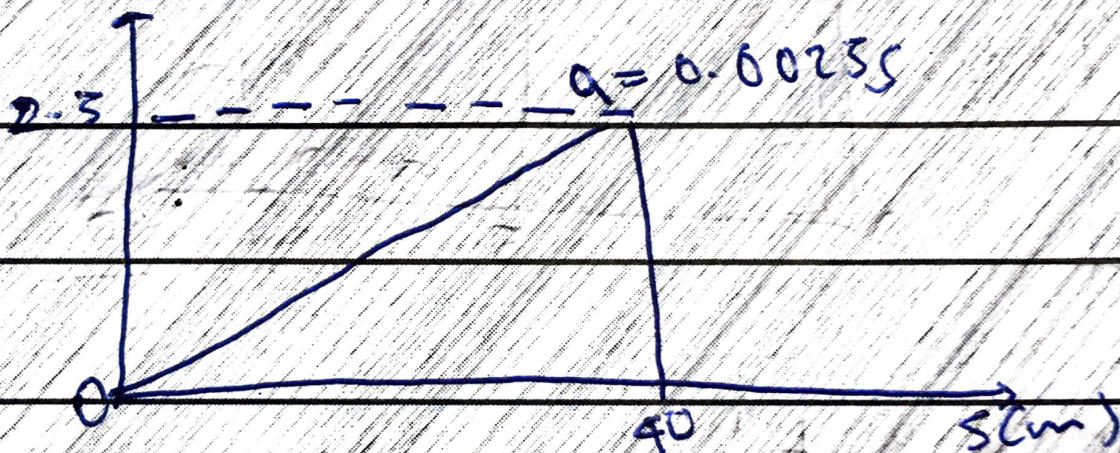
$$a = v (\delta v / \delta s) = 0.25s (0.25)$$

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

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

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

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



$$4) (0 \leq t \leq 5) \text{ secs}$$

$$s = 3t^2$$

$$v = \delta s / \delta t = 6t$$

$$\text{max } v = 6(5) = 30 \text{ m/s}$$

Acceleration:

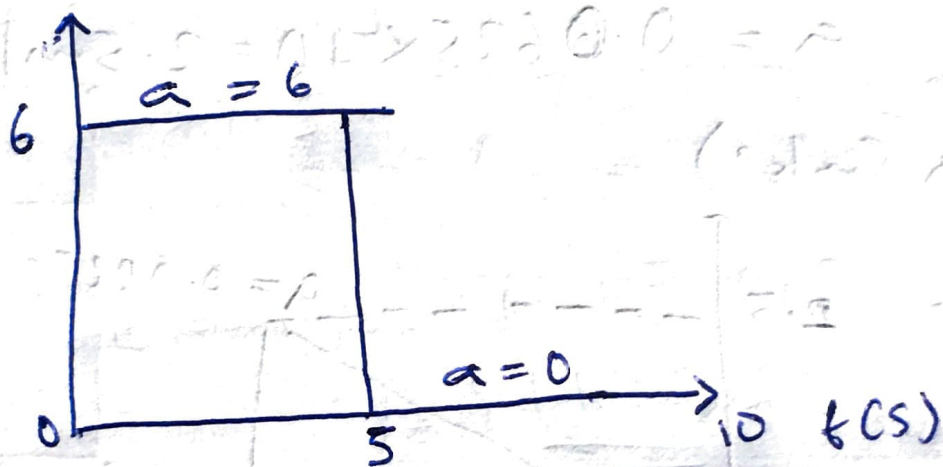
$$0 \leq t \leq 5 \text{ secs}$$

$$v = at \quad a = \frac{\delta v}{\delta t} = 6 \text{ m/s}^2$$

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

$$v = 30 \quad a = \frac{\delta v}{\delta t} = 0 \text{ m/s}^2$$

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



$$5) 0 \leq t \leq t'$$

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

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

$$\int \delta v = \int a \cdot dt$$

$$\int_0^t \delta v = \int_0^t 20 \cdot dt$$

$$v = 20t$$

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

$$v = 20t$$

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

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

$$v_{100} dv = \int_0^t -10 dt$$

$$v - 100 = -10(t - 0)$$

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

$$v = (150 - 10t) \text{ m/s}$$

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

$$0 = 150 - 10t$$

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

$$c) (0 \leq t \leq 5)$$

$$v = 30t \quad \frac{ds}{dt} = v \quad ds = v \cdot dt$$

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

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

$$s = (5(5))^2 = 375 \text{ m}$$

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

$$v = -15t + 225$$

$$\int_0^5 ds = \int_5^{15} (-15t + 225) dt$$

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

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

$$s = 1687.5 - 937.5 = 750 \text{ m}$$

$$\begin{aligned} \text{Total distance} &= (750 + 375) \text{ m} \\ &= \underline{\underline{1125 \text{ m}}} \end{aligned}$$