

Nwachiri Emmanuel Chukwemeka
18/ENG04/054
Electrical/Electronics

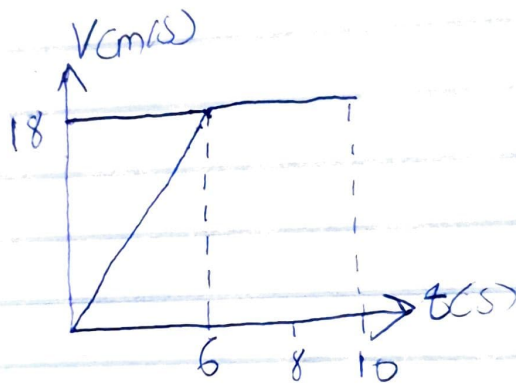
1.) $V = \frac{ds}{dt}$

$$V = 0.5t^2$$

at $t = 6s$

$$V = \cancel{15 \times 6} \quad \cancel{0.5 \times 6} \quad 0.5 \times 6^2$$
$$= 0.5 \times 36$$
$$V = 18m/s$$

V-t graph



2.)
i)

$$S = \int V dt$$

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

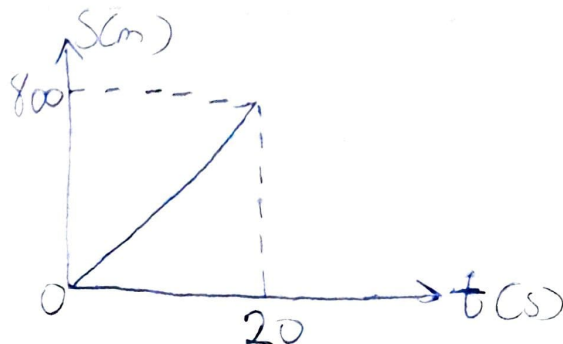
$$S = -2t^2 + 80t$$

$$\text{@ } t = 20s$$

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

$$S = 1600 - 800 = 800m$$

S-t graph

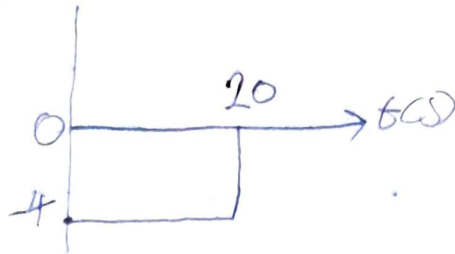


$$ii) a = \frac{dv}{dt}$$

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

at $t = 2 \text{ s}$

a-t graph



$$3.) a = \left(\frac{dv}{ds} \right) v$$

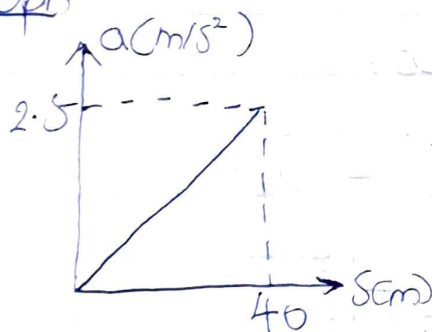
$$v = 0.25 \text{ s}$$

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

$$a = 10 \times 0.25$$

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

a-s graph



$$4.) v = \frac{ds}{dt}$$

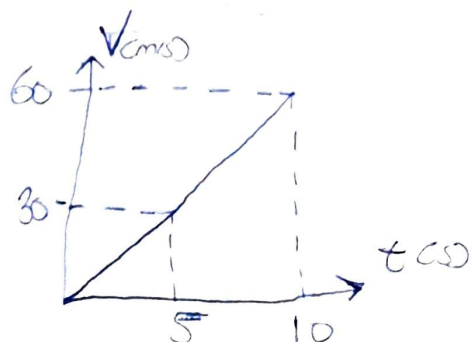
@ $t = 5 \text{ s}$

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

@ $t = 10 \text{ s}$

$$v = 6 \times 10 = 60 \text{ m/s}$$

v-t graph

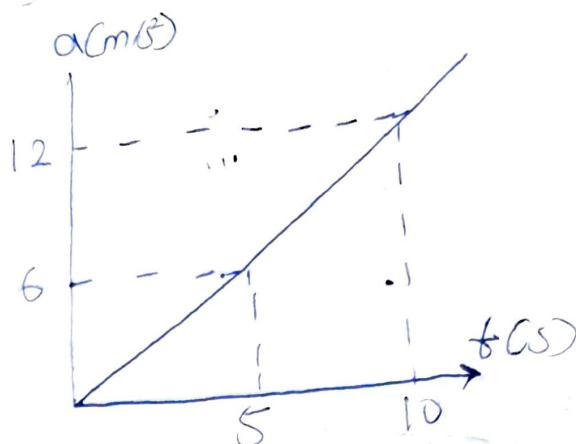


$$ii) a = \frac{dv}{dt}$$

$$@ t = 5s, a = 6 \text{ m/s}^2$$

$$@ t = 10s, a = 12 \text{ m/s}^2$$

a-t graph



$$5.) V = \int a dt$$

$$V = \int 20t$$

$$@ t = 5s$$

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

$$5s < t \leq t'$$

$$\int_{100}^V dv = \int_5^{t'} -10 dt$$

$$V - 100 = -10t \Big|_5^{t'}$$

$$V - 100 = -10t' + 10(5)$$

$$V - 100 = -10t' + 50$$

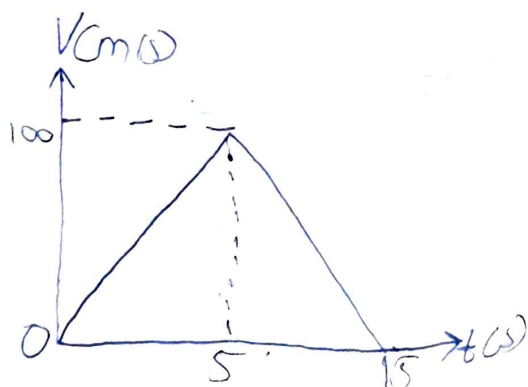
$$@ t', V = 0$$

$$0 - 100 = -10t' + 50$$

$$10t' = 100$$

$$t' = 15s$$

V-t graph



$$6.) \quad 0 \leq t \leq 5$$

$$V = 30t$$

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

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

$$S = 15(5)^2 - 15(0)^2$$

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

$$5 \leq t \leq 15$$

$$V = -15t + 225$$

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

$$S - 375 = \frac{-15t^2 + 225t}{2} \Big|_5^{15}$$

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

$$S - 375 = \left[\frac{-15 \times 225 + 3375}{2} \right] - \left[\frac{-15 \times 25 + 1125}{2} \right]$$

$$S - 375 = (-1687.5 + 3375) - (-187.5 + 1125)$$

$$S - 375 = 750$$

$$S = 750 + 375$$

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

S-t graph.

