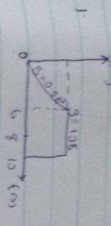


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$v = \frac{ds}{dt}$

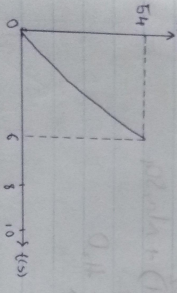
$v = 15t^{\frac{1}{6}}$

$a = t = 6s$

$v = 15 \times 6^{\frac{1}{6}}$

from $t = 6s$ to $s = 10s$, $v = 198$
 $\therefore v = 0$

Net gate



$\frac{d^2s}{dt^2} = \int v dt$
 $= \int (-4t + 40)$

$= -2t^2 + 40t$

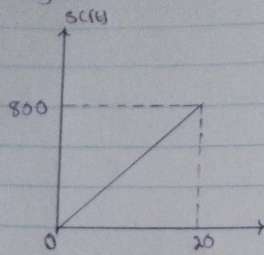
at $t = 20s$

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

$= -800 + 1600$

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

s-t graph

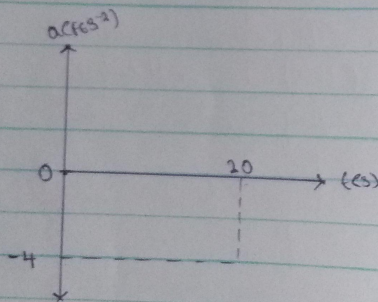


ii) $a = \frac{dv}{dt}$

$$a = -4ft/s^2$$

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

a-t graph



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

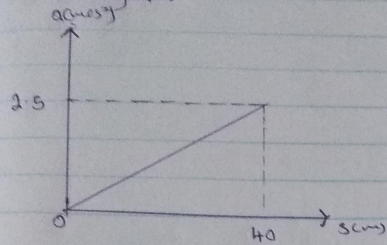
$$v = 0.25s$$

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

$$a = 10 \times 0.25$$

$$a = 2.5m/s^2$$

a-s graph



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

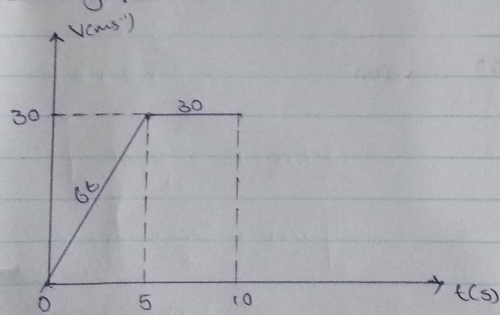
at $t = 5s$

$$v = 6t = 6 \times 5 = 30 \text{ ms}^{-1}$$

at $t = 10s$

$$v = 30 \text{ ms}^{-1}$$

v-t graph



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

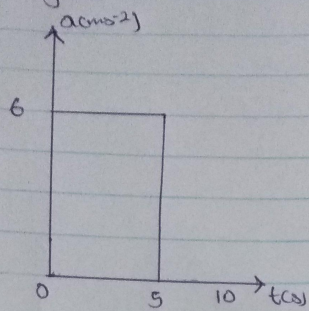
at $t = 5s$

$$a = 6 \text{ ms}^{-2}$$

at $t = 10s$

$$a = 0 \text{ ms}^{-2}$$

a-t graph



$$5. \quad v = \int a dt$$

$$v = \int 20 dt$$

$$v = 20t$$

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

$$v = 20 \times 5 = 100 \text{ ms}^{-1}$$

$$5s < t \leq t$$

$$\int_{100}^v dv = \int_{5}^t -10 dt$$

$$v - 100 = -10t \Big|_5^t$$

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

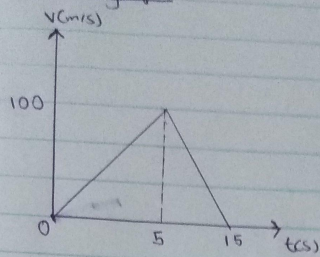
$$\text{at } t: v = 0$$

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

$$10t = 150$$

$$t = 15s$$

V-t graph



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

$$v = 30t$$

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

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

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

$$= 15 \times 25$$

$$= 375m$$

$$5 \leq t \leq 15s$$

$$v = -15t + 225$$

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

$$s - 375 = \left. \frac{-15t^2}{2} + 225t \right|_5^{15}$$

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

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

$$s - 375 = 1687.5 - 937.5$$

$$s - 375 = 750$$

$$s = 1125m$$

S-t graph

