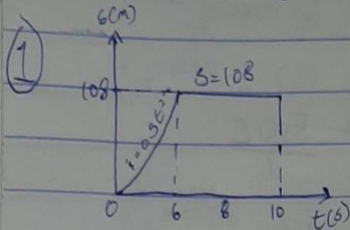


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$$v = \frac{dy}{dt}$$

$$v = 1.5t^2$$

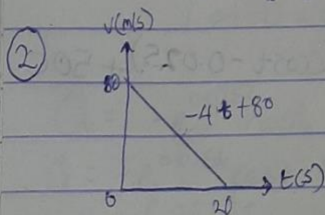
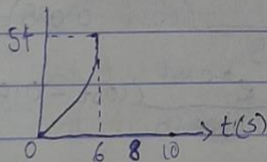
$$\text{at } t=6s$$

$$v = 1.5 \times 6^2$$

$$= 1.5 \times 36$$

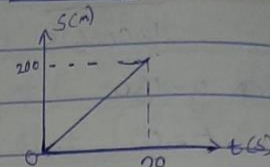
From $t=6s-10, s=108$
 $\therefore v=0$

v-t graph



(i) $s = \int v dt$
 $= \int (-4t + 80)$
 $s = -2t^2 + 80t$
at $t=20s$
 $s = -2(20)^2 + 80(20)$
 $s = 1600 - 800m$
 $= 800m$

s-t graph



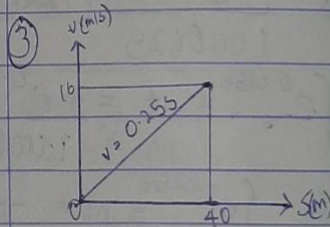
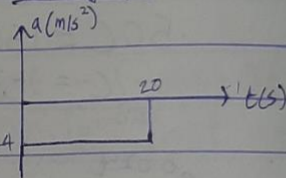
(ii) Acceleration

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

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

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

a-t graph



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

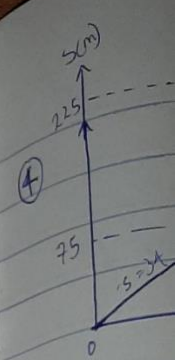
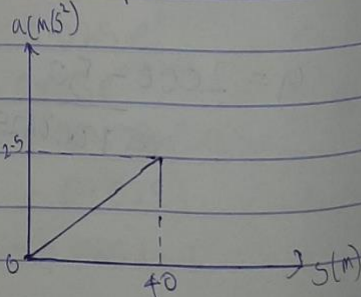
$$v = 0.25s$$

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

$$a = 10 \times 0.25$$

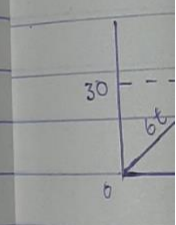
$$a = 2.5 \text{ m/s}^2$$

a-s graph



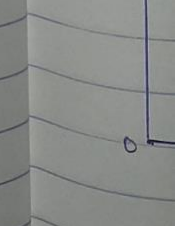
(i) $v = \frac{ds}{dt}$
at
 $v = 6t$

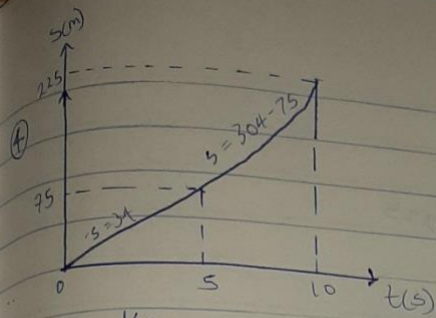
v-t graph



(ii) $a = \frac{dv}{dt}$
at t
 $a =$
at

a

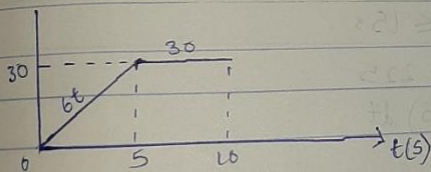




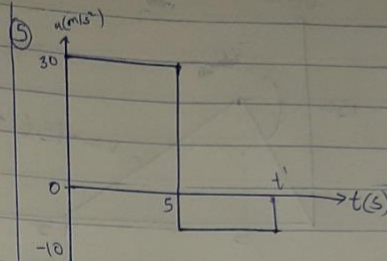
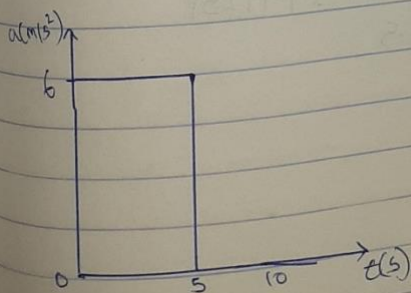
① $v = \frac{ds}{dt}$
 at $t = 5s$
 $v = 6t = 6 \times 5$
 $= 30 \text{ m/s}$

at $t = 10s$
 $v = 30 \text{ m/s}$

v-t graph



② $a = \frac{dv}{dt}$
 at $t = 5s$
 $a = 6 \text{ m/s}^2$
 at $t = 10s$
 $a = 0 \text{ m/s}^2$

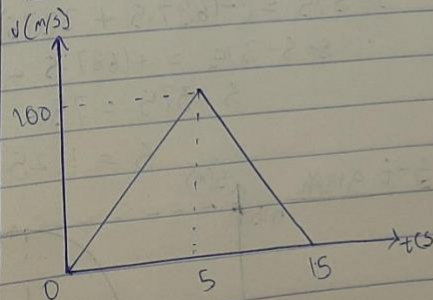


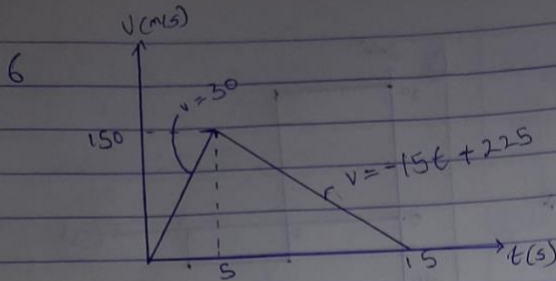
③ (i) $v = \int a dt$
 $v = \int 20 dt$
 $v = 20t$
 at $t = 5s$
 $v = 20 \times 5 = 100 \text{ m/s}$

$5s < t \leq t'$
 $\int_{100}^v dv = \int_{5}^{t'} -10 dt$

$v - 100 = -10t \Big|_5^{t'}$
 $v - 100 = -10t' + 10(5)$
 $v - 100 = -10t' + 50$
 at $t = t', v = 0$
 $0 - 100 = -10t' + 50$
 $10t' = 150$
 $t' = 15s$

v-t graph





$$0 \leq t \leq 5$$

$$v = 30t$$

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

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

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

$$s = 15 \times 25$$

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

$$5 \leq t \leq 15$$

$$v = -15t + 225$$

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

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

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

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

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

$$s - 375 = +1687.5 - 937.5$$

$$s - 375 = 750$$

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

