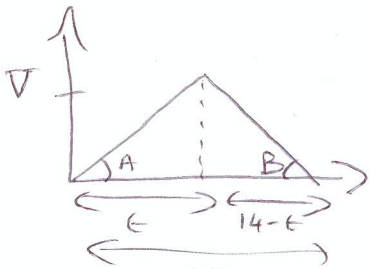
1994 HLC :

Q1 : accel = 6

decel = -8.



Manse

accel = Slope of speed time graph.

$\therefore .6 = \tan A = \frac{V}{t} \Rightarrow V = .6t$

$.8 = \tan B = \frac{V}{14-t} \Rightarrow V = (14-t).8$

$\therefore \quad .6t = (14-t).8$

$\Rightarrow \quad t = 8$ secs

$\therefore \quad v = 4.8$ m/s

Otherwise.

Reg I :

$u = 0$
$v = V$
$t = t$
$a = .6$

$v = u + at$

$\Rightarrow V = 0 + .6t$

Reg II

$u = V$
$v = 0$
$t = 14 - t$.
$a = -.8$

$v = u + at \Rightarrow$

$0 = V - .8(14-t)$

$V = .8(14-t)$

$\therefore .6t = .8(14-t)$

$\Rightarrow t = 8$

$\therefore V = 4.8$ m/s.

$\therefore S = \frac{1}{2} V(T) = \frac{1}{2}(4.8)(14) = (2.4)(14) = 33.6$

(ii) up accel f

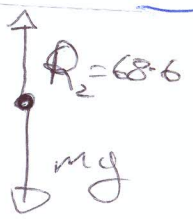
Forces:

N II $\Sigma f = ma$

$\Rightarrow . \quad 98 - mg = mf$

down accel 2f

Forces:



N II $\Sigma f = ma$

$mg - 68.6 = m(2f)$

Pulley of spring Balance, forces

S - Appt wt = 0

$\Rightarrow$ S = Appt wt.

But Appt wt = R

S ↑ App wt ↓

$\therefore \quad 98 - mg = mf$

$-68.6 + mg = 2mf$

$29.4 = 3mf.$

$\frac{9.8}{m} = f$

$\therefore \quad 98 - mg = m\left(\frac{9.8}{m}\right)$

$\Rightarrow . \quad -mg = 9.8 - 98$

$\Rightarrow \boxed{mg = 88.2} \Rightarrow \boxed{m = 9 \text{ kg}}$

(ii) Downward accel $= 2f = 2\left(\frac{9.8}{9}\right) = \frac{2g}{9}$ m/s^2.