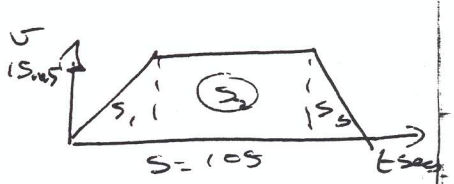
1973

Q1

S = 105



Accel	decel
$a = 2$	$a = -4$
$v = 15$	$u = 15$
Eqns $\Rightarrow t = 7.5$	$\Rightarrow t = ?$
$\Rightarrow S = 56.25$	$\Rightarrow S = 28.125$

$S_1 + S_3 = 56.25 + 28.125$

$= 84.375$

$= 84\frac{3}{8}$

[$84\frac{3}{8}$ to allow to get to $15\ ms^{-1}$]

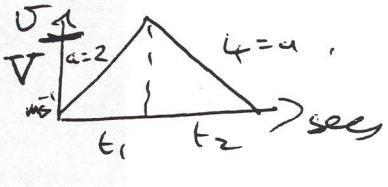
$\Rightarrow$ So can make constant speed for

20.625 m [105 − 84.375]

$\Rightarrow$ Time constant $= \frac{20.625}{200} = 12.625$

S = 54

[Can't reach $15\ ms^{-1}$]



2 : 4 as $t_2 : t_1$

$\Rightarrow t_2 = \frac{1}{3}$ total time $= \frac{T}{3}$

$\Rightarrow t_1 = \frac{2}{3}$ total time $= \frac{2T}{3}$.

$\therefore V = 0 + 2\left[\frac{2}{3}T\right]$

$\boxed{V = \frac{4}{3}T}\ ms^{-1}$

$\therefore S = \frac{1}{2}Vt_1 + \frac{1}{2}Vt_2$ (Area)

$\Rightarrow 54 = \frac{1}{2}\left(\frac{4}{3}T\right)\left(\frac{2}{3}T\right) + \frac{1}{2}\left(\frac{4}{3}T\right)\left(\frac{1}{3}\right)T$

$\Rightarrow 54 = \frac{4}{9}T^2 + \frac{2}{9}T^2$

$\Rightarrow 54 = \frac{6}{9}T^2$

$\Rightarrow 81 = T^2$

$9\ sec = T$