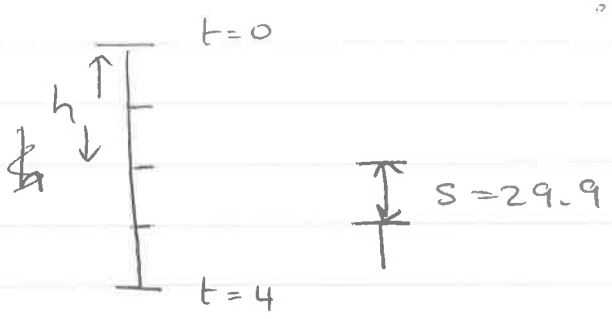
LCH 07 1a

$u = u$
$a = g$
$t = 4$



$s = ut + \frac{1}{2}at^2$
$h = 4u + \frac{1}{2}g4^2$

$4u +$

1st 2 sec : $h = 2u + \frac{1}{2}(9.8)(2^2)$

$h = 2u + 19.6$ *

1st 3 sec : $h + 29.9 = 3u + \frac{1}{2}(9.8)(9)$

$h = 3u + 14.8^2$ *

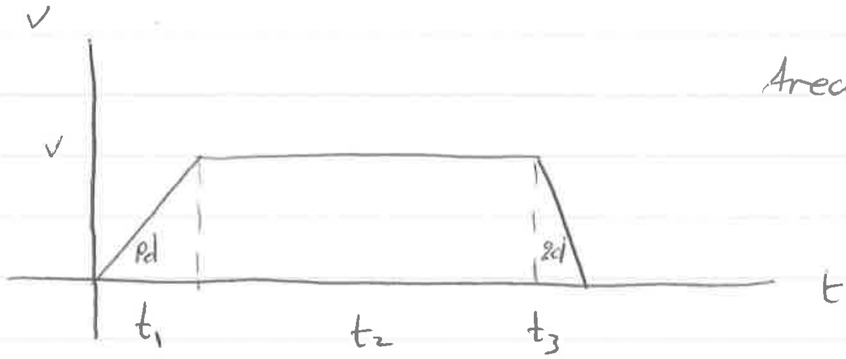
$2u - h = -19.6$
$3u - h = -14.82$
$u = 5.4$ ~~4.8~~

ii) $s = ut + \frac{1}{2}at^2$
$s = (5.4)(4) + \frac{1}{2}(9.8)(4^2)$

$= 100$ m

LCH 07 1.b

$u = 0$
$v = V$



Area = d.

ii) $$\text{Av. Speed} = \frac{V}{p+q+b}$$

$$\text{Av. speed} = \frac{\text{total Dist}}{\text{total time}}$$

$$= \frac{d}{t_1 + t_2 + t_3}$$

But (1) $\frac{1}{2} t_1 V = pd$ (2) $\frac{1}{2} t_3 V = qd$

(3) $t_2 V = d - pd - qd$

$$\text{Av. speed} = \frac{d}{\frac{2pd}{V} + \frac{d - pd - qd}{V} + \frac{2qd}{V}}$$

$$= \frac{V}{2p + 1 - p - q + 2q}$$

$$= \frac{V}{p + 1 + q}$$

$\Rightarrow \quad b = 1$

1. **(a)** A ball is thrown vertically upwards with an initial velocity of 39.2 m/s.

2008

Find **(i)** the time taken to reach the maximum height

(ii) the distance travelled in 5 seconds.

↑ $u = 39.2$, $v = 0$, $t = ?$, $a = -g$

(i) $v = u + ft$

$0 = 39.2 - 9.8(t)$

$t = 4$ s

(ii) $s = ut + \frac{1}{2}ft^2$

$= 39.2(4) - 4.9(16)$

$= 78.4$ m

dist in 5 sec

⇒ dist ↑ in 4 sec = 78.4m

\+

dist ↓ in 1 sec = 4.9m

83.3m

fifth second :

$s = ut + \frac{1}{2}ft^2$

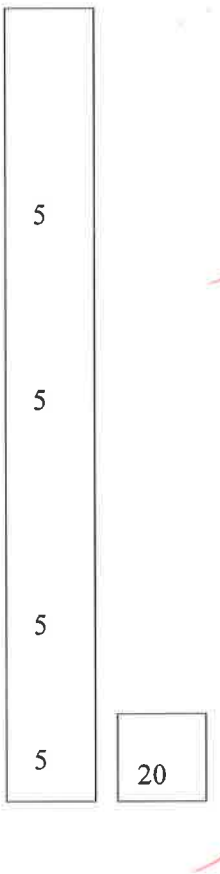
$= 0 + 4.9(1)$

$= 4.9$ m

$u = 0$, $a = 9.9$, $s = ?$, $t = 1$

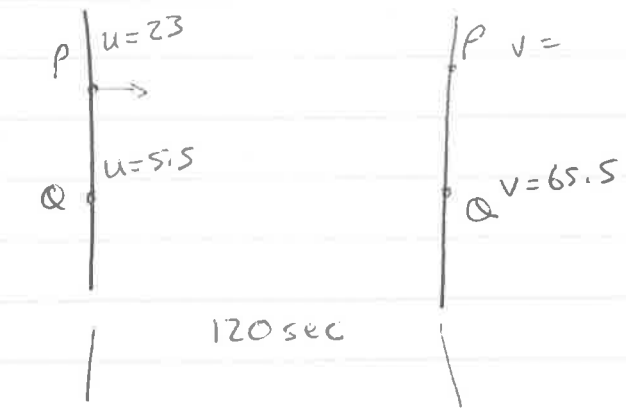
total distance $= 78.4 + 4.9$

$= 83.3$ m



distance not displacement = 73.5 (5)

2008 (H) 1.b



Same place
Same time
$V_P > V_Q$

u
u
$V_Q > V_P$

i) Q : $v = 65.5$, $u = 5.5$, $t = 120$, $a = ?$ ⟩ $v = u + at$, $a = \frac{1}{2}$ m/s²

$s = ut + \frac{1}{2}at^2$: $s = 5.5(120) + \frac{1}{2}(.5)(120^2)$
$= 4260$m

P : $u = 23$, $a = ?$, $s = 4260$, $t = 120$ ⟩ $s = ut + \frac{1}{2}at^2$, $a = \frac{s}{24}$ m/s²

10

ii) $v = u + at$
$= 23 + \frac{s}{24}(120)$
$= 48$ m/s²

10

iii) $V_P = V_Q$
$23 + \frac{s}{24}t = 5.5 + \frac{1}{2}t$
$t = 60$ → 4

find s, for this t 10
$s_P = 23(60) + \frac{1}{2}\left(\frac{s}{24}\right)(60)^2 = 1755$
$s_Q = 5.5(60) + \frac{1}{2}\left(\frac{1}{2}\right)(60)^2 = 1230$
Ahead = 525 m