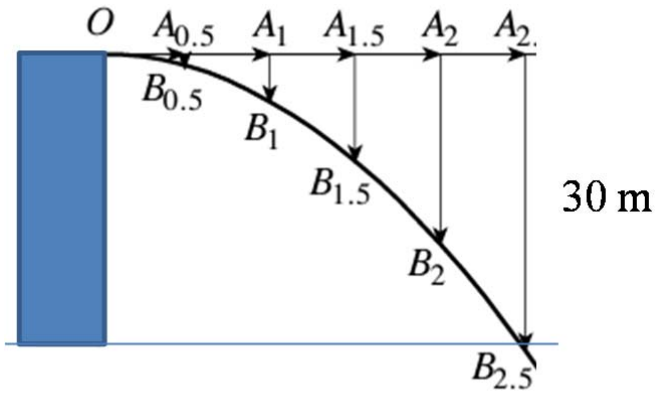
A-LEVELS: HOME WORK – WEEK 1

HW 1A, Pg 3

(1)

u	15	m/s	
g	10	m/s^2	
	ut	0.5gt^2	
Time	**A**	**B**	**Distance**
0.0	0	0	0
0.5	7.5	1.25	8
1.0	15	5	16
1.5	22.5	11.25	25
2.0	30	20	36
2.45	36.75	30.0	47

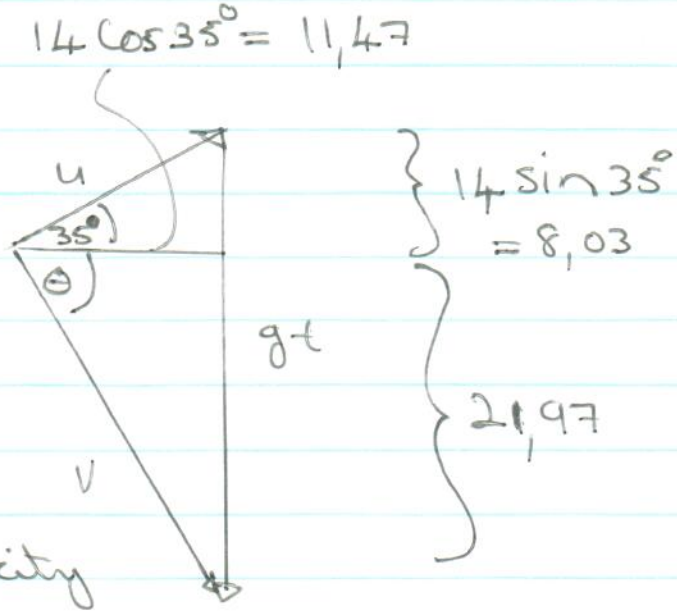


Distance = 47 m
Time = 2.45 s

HW 1A Pg 4

4.) $\underline{v} = \underline{u} + \underline{g}t$

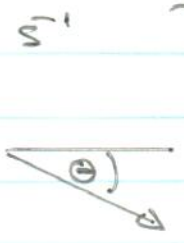
+↓) $gt = 10(3) = 30$



$V = \sqrt{11,47^2 + 21,97^2}$

$\therefore V = 24,8 \text{ m s}^{-1}$

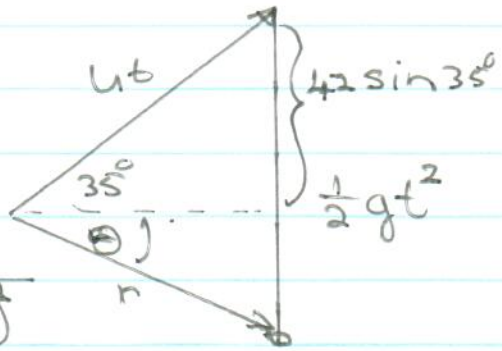
$\theta = 62,4°$



Position : $\underline{r} = \underline{u}t + \frac{1}{2}\underline{g}t^2$

+→) ut: $14(3) = 42 \text{ m}$ ∠35°

+↓) $\frac{1}{2}gt^2$: $\frac{1}{2}10(3)^2 = 45 \text{ m}$ ↓



$r = \sqrt{(45 - 42\sin 35°)^2 + (42\cos 35°)^2}$

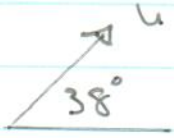
$= \sqrt{20,91^2 + 34,4^2}$

$= 40,3 \text{ m}$

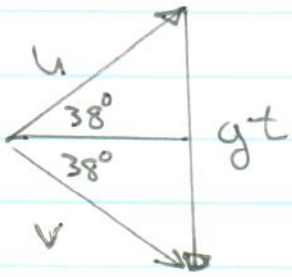
$\theta = \tan^{-1}\left(\frac{20,91}{34,4}\right) = 31,3°$ ↘θ

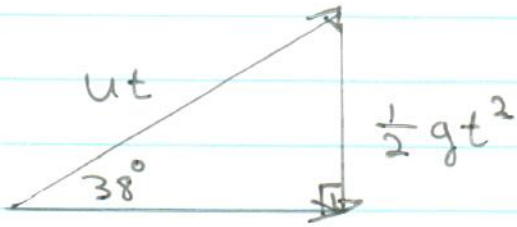
1A Pg 4

(6) $u = 70\ m\,s^{-1}$



Velocity





$gt = 2u\sin 38°$

$\therefore t = 8{,}62\ s$

Position

$r = ut\cos 38° = 70 \cdot 8{,}62 \cdot \cos 38° = 475\ m$

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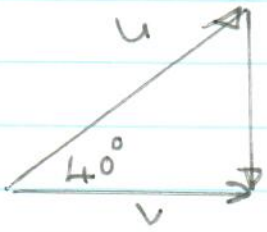
(7) 

Reaches greatest height at $t = 3s$

At greatest height: $v \rightarrow$ (Horizontal)

$\underline{v} = \underline{u} + \underline{g}t$



b) $gt = 10(3) = 30\ m\,s^{-1}$

$\therefore u = \dfrac{30}{\sin 40°} = 46{,}7\ m\,s^{-1}$

1A Pg 4

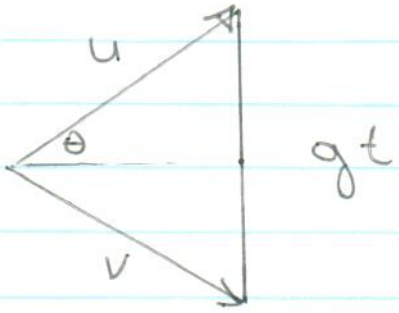
(10) $u_A = 15\ m\,s^{-1}$ at 25°

$u_B = 15\ m\,s^{-1}$ at 65°

(a) See attached

(b) From diagram:

(c) $\underline{v} = \underline{u} + \underline{g}t$



$gt = 2u\sin\theta$

$\therefore\ t = \dfrac{2u\cdot\sin\theta}{g}$

$\theta = 25^\circ$: $t = \dfrac{2\cdot 15\cdot \sin 25^\circ}{10} = 1{,}27\ s$

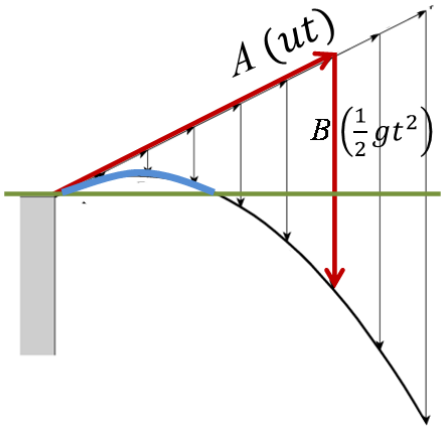
$\theta = 65^\circ$: $t = \dfrac{2\cdot 15\cdot \sin 65^\circ}{10} = 2{,}72\ s$

HW 1A, Pg 4

(10) DIAGRAM

$\theta = 25°$

u	15	m/s	
angle	25	deg	
g	10	m/s^2	
	ut	0.5gt^2	
Time	**A**	**B**	**Height**
0.0	0	0	0
0.5	7.5	1.25	2
1.0	15	5	1
1.3	19.5	8.45	0



$\theta = 65°$

u	15	m/s	
angle	65	deg	
g	10	m/s^2	
	ut	0.5gt^2	
Time	**A**	**B**	**Height**
0.0	0	0	0
0.5	7.5	1.25	6
1.0	15	5	9
1.5	22.5	11.25	9
2.0	30	20	7
2.5	37.5	31.25	3
2.7	40.5	36.45	0