

WAKISSHA JOINT MOCK EXAMINATIONS

MARKING GUIDE

Uganda Certificate of Education

UCE August 2018

PHYSICS 535/3



WAKISSHA 2018 PHYSICS 535/PAPER 3 MARKING GUIDE

No	Details	Marks																												
No1.	R1- Recording time t of 20 complete oscillations (1dp-stop clock or 2dps-stop watch) (value 1 unit $\frac{1}{2}$)	01 $\frac{1}{2}$																												
	Subtotal for recording	=01 $\frac{1}{2}$																												
	$t = 38.53\text{s}$																													
	<u>dmTable of results</u>																													
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>$l(m)$</th> <th>$\sqrt{l}(m^{\frac{1}{2}})$</th> <th>t(s)</th> <th>range $t(s)$</th> </tr> </thead> <tbody> <tr> <td>0.900</td> <td>0.949</td> <td>38.53</td> <td>34.0 - 42.0</td> </tr> <tr> <td>0.800</td> <td>0.894</td> <td>36.00</td> <td>32.0 - 40.0</td> </tr> <tr> <td>0.700</td> <td>0.837</td> <td>34.22</td> <td>29.5 - 37.5</td> </tr> <tr> <td>0.600</td> <td>0.775</td> <td>31.34</td> <td>27.0 - 35.0</td> </tr> <tr> <td>0.500</td> <td>0.707</td> <td>28.81</td> <td>24.0 - 32.0</td> </tr> <tr> <td>0.400</td> <td>0.632</td> <td>25.81</td> <td>21.0 - 29.0</td> </tr> </tbody> </table>	$l(m)$	$\sqrt{l}(m^{\frac{1}{2}})$	t(s)	range $t(s)$	0.900	0.949	38.53	34.0 - 42.0	0.800	0.894	36.00	32.0 - 40.0	0.700	0.837	34.22	29.5 - 37.5	0.600	0.775	31.34	27.0 - 35.0	0.500	0.707	28.81	24.0 - 32.0	0.400	0.632	25.81	21.0 - 29.0	
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T ₁	-Design of a table A values entered with at least three $\frac{1}{2}$ columns (1 mark) with 1 column labelled with units and all values of l entered as given in the question	01																												
T ₂	-labelling $\sqrt{l}, (m^{\frac{1}{2}}), t, (s)$ the rest of the columns with $\sqrt{l}(m^{\frac{1}{2}})$, $t(s)$ @ $\frac{1}{2}$ mark	-02 01																												
T ₃	-values of \sqrt{l} correctly calculated to appropriate significant 3dp. figures (3 significant figures each $\frac{1}{2}$) @ $\frac{1}{2}$ mark	03																												
	Five other values of t each 1mark decreasing and should be in the stated ranges. (@ 2marks)	05 10																												
	Subtotal for table	=11 17 $\frac{1}{2}$																												
G ₁	-A graph of t against \sqrt{l}	01																												
G ₂	-Drawing and labeling axes. @ 1 mark	01 02																												
G ₃	-Suitable and convenient scale with starting values indicated each $\frac{1}{2}$ marks	01 02																												
G ₄	-Correctly plotted points @ = 1 mark	06 03																												
G ₅	-line of best fit = 1mark	01																												
G ₆	-method of slope (triangle enclosing all plotted points	01																												
	Subtotal for graph	=11 10																												
	$s = \frac{\text{change in } t}{\text{change in } \sqrt{l}}$																													

	$s = \frac{39.2 - 23.6}{0.975 - 0.575}$ $s = \frac{15.6}{0.400}$ $s = 39.0 \text{ Sn}^{-1} \rightarrow 39.0 \text{ Sm}^{-1}$ $s = \frac{40\pi}{\sqrt{g}}$ $\sqrt{g} = 3.22$ $g = 10 \text{ ms}^{-2}$ $g = 10 \cdot 4 \text{ m s}^{-2}$	
S but not 5		

C ₁	-Calculation of slope -reading Coordinates @ 1/2 mark.	01
	- Substitution $\frac{1}{2} \text{ mle}$	01 $\frac{1}{2}$
	- Value 1 mark; Unit 1/2 mark. $\frac{1}{2} \text{ mle}$	0 $\frac{1}{2}$
E ₂	- Substitution in the formula Arithmetic Accuracy (9.00 - 11.0) (9.00 - 11.0)	01 $\frac{1}{2}$
	Value of (01) Unit (1/2) Unit (m s^{-2}) 10 - 11.0	1 $\frac{1}{2}$
	Subtotal for calculations C	=06 $\frac{2}{2}$

	TOTAL FOR NUMBER ONE	=30
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No.2	D1-Drawing the outline M ₀ M ₁ about 15cm $\rightarrow A_1 = \frac{1}{2}$	01
	D2-Drawing G ₁ NR at 5° to M ₀ M ₁ $\frac{1}{2}$	0.5
D ₂	- holes clearly seen $\frac{1}{2}$	0.5
R ₁	-Drawing line M ₀ M ₂ at angle D = 10° to M ₀ M ₁ , $A_2 = \frac{1}{2}$	0.5
R ₂	-Reading value of angle d (0dp)	01
R ₃	-Reading value of angle D (0dp)	01
	Subtotal for D and R	=05 $\frac{1}{2}$

$\theta(^{\circ})$	$D(^{\circ})$	$(D-d)^{(\circ)}$	$\theta(^{\circ})$	$D(^{\circ})$	$(D-d)^{(\circ)}$
10	32	20	10	25 - 35	
20	53	41	20	45 - 55	
30	70	58	30	65 - 75	
40	99	87	40	85 - 95	
50	108	96	50	105 - 115	
60	130	118	60	125 - 135	

T ₁	-Design of table with 3 columns and θ column labelled with all values entered with unit	1 $\frac{1}{2}$	01
T ₂	-label of the rest of the columns with units each 1 mark	02	02
T ₃	-Recording of more 5 values of D each mark	05	05
	- Recording of 6 correctly calculated values of (D-d) each $\frac{1}{2}$	03	0.3
	Subtotal for T	=10 $\frac{1}{2}$	1 $\frac{1}{2}$

G ₁	-A graph of (D-d) against θ	01	01
G ₂	-label of each of the axes with units	-01	02
G ₃	-Suitable and convenient scale	-01	02
G ₄	-plotting 6 points correctly	-06	03
G ₅	-line of best fit	01	01
G ₆	-Method of getting slope 1 mark	-0.5	$\frac{01}{10}$
Subtotal for G		10.5	10 ✓
C1-Calating the slope t		-03	$1\frac{1}{2}$
-Correct substitution 1 mark			$1\frac{1}{2}$
- Arithmetic 1 mark			$0\frac{1}{2}$
-Accuracy 1 mark			$\frac{1}{2}$
TOTAL FOR NUMBER 2		30mks	

$$\text{glancing angle} = 5^{\circ}$$

$$d = 12^{\circ}$$

$$D = 32^{\circ}$$

$$\theta = 10^{\circ}$$

$$(D-d) = (32^{\circ} - 12^{\circ}) = 20^{\circ}$$

Table of results

$\theta(^{\circ})$	D($^{\circ}$)	(D-d)($^{\circ}$)
10	32	20
20	53	41
30	70	58
40	99	87
50	108	96
60	130	118

No 3

R₁

-Recording of voltmeter reading when I = 0.300

~~(2.45-2.60)V~~ value $\{0.1\}$ unit $\{1\}$

$(1.80 - 2.80)V$ 03 $\frac{1}{2}$

-2-

$3\frac{1}{2}$

I(A)	V (V)
0.30	2.45-2.60 - 1.80 - 2.80
0.40	2.30 - 1.45 - 2.60
0.50	1.80 - 1.25 - 2.40
0.60	1.90 - 1.15 - 2.20
0.70	1.60 - 0.85 - 2.00
-0.80	1.45

T ₁	-Design of table of results of atleast 2 columns with I column labelled with unit and all its values entered	01
T ₂	-label of column V(V)	01
T ₃	-Recording of more five values of v(2.dps) 2 marks each Subtotal for table (T) 3 mks @	10-12 =12- 17½
G ₁	-Title A graph of I against V	01
G ₂	-Labels of axes Drawing and labelling of axes with units Ink @	01-02
G ₃	-Suitable and convenient scale 1 mks @	01-02
G ₄	-Correct plotting (1 mark each) 5 points on graph paper $\frac{1}{2}$ mks @	05-02½
G ₅	-Line of best fit	1
G ₆	-Method of slope	1
	Subtotal for graph G	=10 09½
C ₁	-Calculation of r [substitution (1 mks), value (1 mks), unit (1 mks)] -Intercept, E, recorded value (01mark) unit (01mark)	03-02
	Subtotal for E and E	=05
TOTAL FOR NUMBER 3		30mks

↓ C₁ — Calculation of slope, S

$$\begin{array}{l} \text{— Substitution} \quad \text{——— } \frac{1}{2} \\ \text{— Unit } (\Omega^{-1}) \quad \text{——— } \frac{1}{2} \end{array}$$

C₂ — Calculation of r from $r = \frac{1}{S}$

$$\begin{array}{l} \text{Substitution} \quad \text{——— } \frac{1}{2} \\ \text{Unit } (\Omega) \quad \text{——— } \frac{1}{2} \end{array}$$

I_h — Recording of the intercept, E on V-axis.

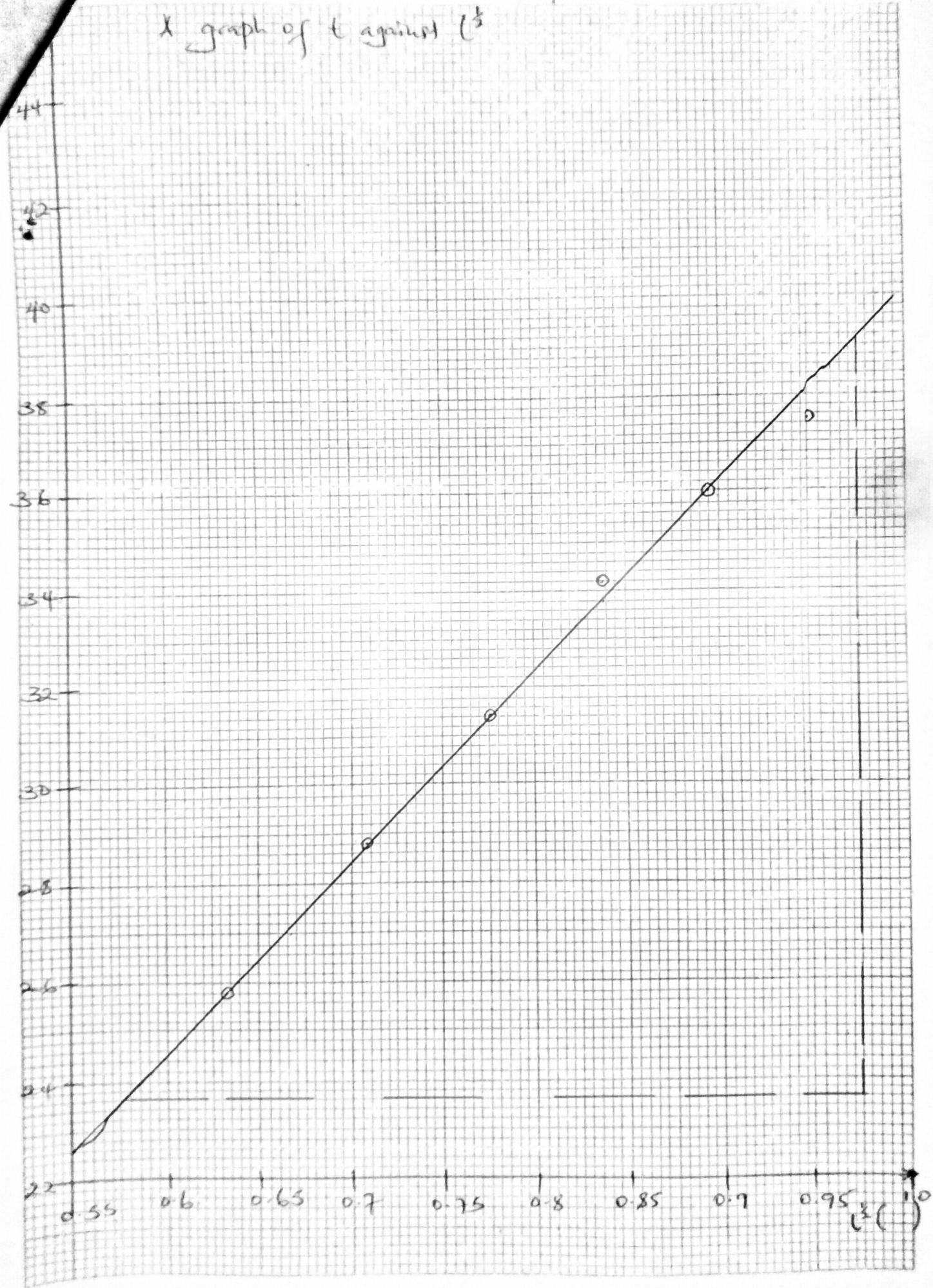
$$\text{Value with Unit} \quad \text{——— } \frac{01}{03}$$

Total for Question 3

30 mks

No. 1

graph of t against $\ell^{\frac{1}{2}}$



A graph of $(D - d)$ against D .

No.

$$t = \frac{\bar{AC}}{\bar{CB}}$$

$$\text{where } \bar{AC} = 138^\circ - 10^\circ = 128^\circ$$

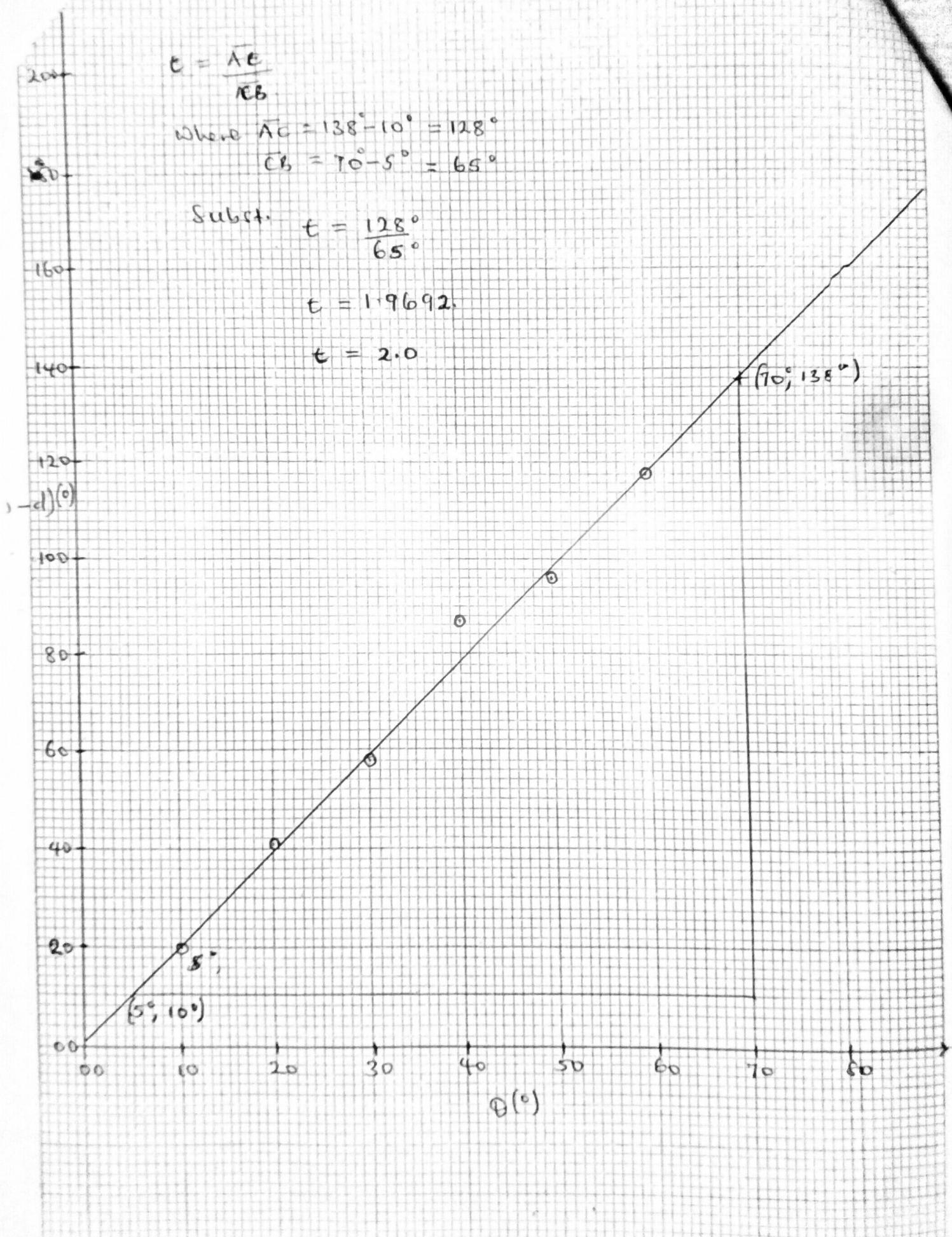
$$\bar{CB} = 70^\circ - 5^\circ = 65^\circ$$

$$\text{Subst. } t = \frac{128^\circ}{65^\circ}$$

$$t = 1.9692$$

$$t = 2.0$$

$(70^\circ, 138^\circ)$



No 3

A GRAPH OF I AGAINST \sqrt{V} 