

**ASUMBI GIRLS HIGH SCHOOL**  
**TERM 2 – DECEMBER 2021**  
**FORM 4 – PHYSICS PAPER 3**

**MARKING SCHEME**

1. iii)

Length from A to B(cm)	80	76	72	68	64	60
Time for 10 oscillations(s)	10	11	12	13	14	15
Periodic time T(s)	1.0	1.1	1.2	1.3	1.4	1.5
$T^2(s^2)$	1.00	1.21	1.44	1.69	1.96	2.25
$2\theta$	$150^\circ$	$138^\circ$	$130^\circ$	$108^\circ$	$104^\circ$	$96^\circ$
$\theta$	$75^\circ$	$69^\circ$	$65^\circ$	$54^\circ$	$52^\circ$	$48^\circ$
$\cos \theta$	0.2588	0.3883	0.4226	0.5878	0.6157	0.6691

✓2.5

✓1

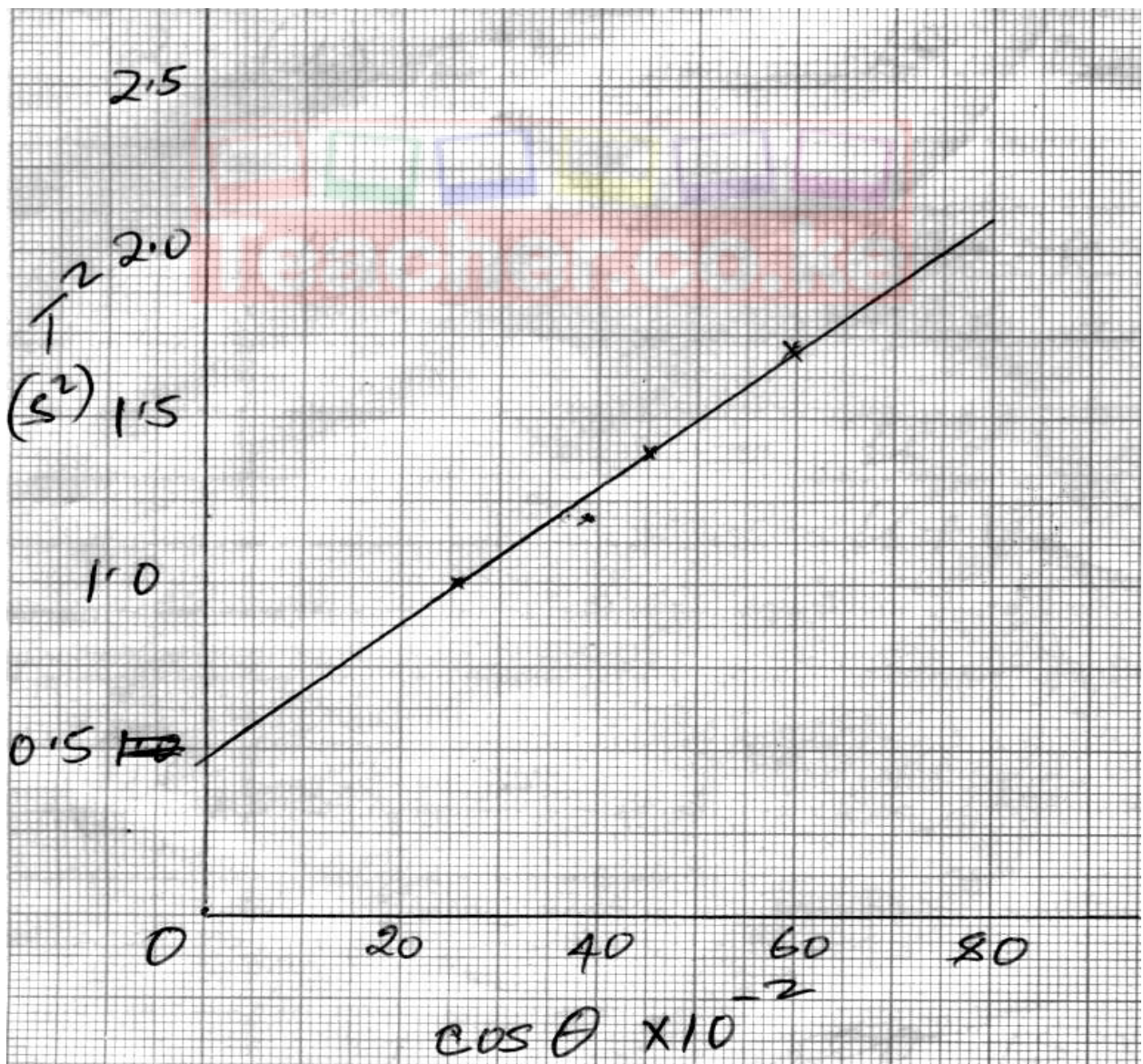
✓1

✓2.5

✓1

✓1

f) ✓1 ✓1 ✓1



g) Slope,  $S = \frac{\partial Y}{\partial X}$

$$\left( 20 \times 10^{-2}, 0.375 \right), \left( 75 \times 10^{-2}, 2.0 \right) \quad \checkmark 1$$

$$S = \frac{2.0 - 0.375}{(75 - 20) \times 10^{-2}} \quad \checkmark 1 = 2.95 \checkmark 1$$

h)  $S = \frac{1.6\pi^2}{k}$

$$k = \frac{1.6\pi^2}{2.95} \sqrt{1} \sqrt{1} = 5.353 \sqrt{1}$$

## 2. PART A

a) (viii)

Angle $i^\circ$	10	20	30	40
Distance x (cm)	5.2	4.5	3.9	3.4

(ix)  $b = 6.2 \text{ cm} \checkmark$

(x)  $A_x = 4.25 \text{ cm} \checkmark$

(xi) Refractive index =  $\frac{6.2 \checkmark}{4.25} = 1.45 \pm 0.05 \checkmark$

Q2.a) iii)

**PART I**  
**Table III**

<b>L(cm)</b>	100	80	60	40	20	0
<b>V(volt)</b>	0.5 – 0.7	0.6 – 1.0	0.7 – 1.1	0.8 – 1.2	0.9 – 1.3	1.1 – 1.5
<b>s)</b>	0.08 – 0.12	0.13 – 0.17	0.18 – 1 0.22	0.33 – 0.37	0.68 – 0.72	1.23 – 1.27
<b>I (A)</b>	0.12 – 0.16	0.14 – 0.18	0.15 – 0.19	0.16 – 0.20	0.17 – 0.21	0.18 – 0.22
	0.04 – 0.08	0.06 – 0.10	0.08 – 0.12	0.12 – 0.16	0.14 – 0.18	0.16 – 0.20

Try both tables and use the one that gives advantage to the candidate. For each correct value / entry give  $\checkmark \frac{1}{2}$  for a maximum of 5 for both v and I

**Total (5mrks)**

iv)

Axes :- should be well labeled with correct units  $\checkmark 1$

Scale :- Simple and uniform  $\checkmark 1$

Plotting : correct should be smooth and passing through at least 3 correctly plotted points within 1 small square  $\checkmark 1$

***N/B curve should be continuous***

**Total (5mrks)**

iii) For drawing a tangent at  $I = 0.15\text{A}$  ✓1

$$\text{Slope} = \frac{\Delta V}{\Delta I}$$

$$= \frac{0.85 - 0.65}{0.175 - 0.13} \quad \checkmark \frac{1}{2} \text{ correct intervals from tangent}$$

$$= 4.4444 \text{ V/A}$$

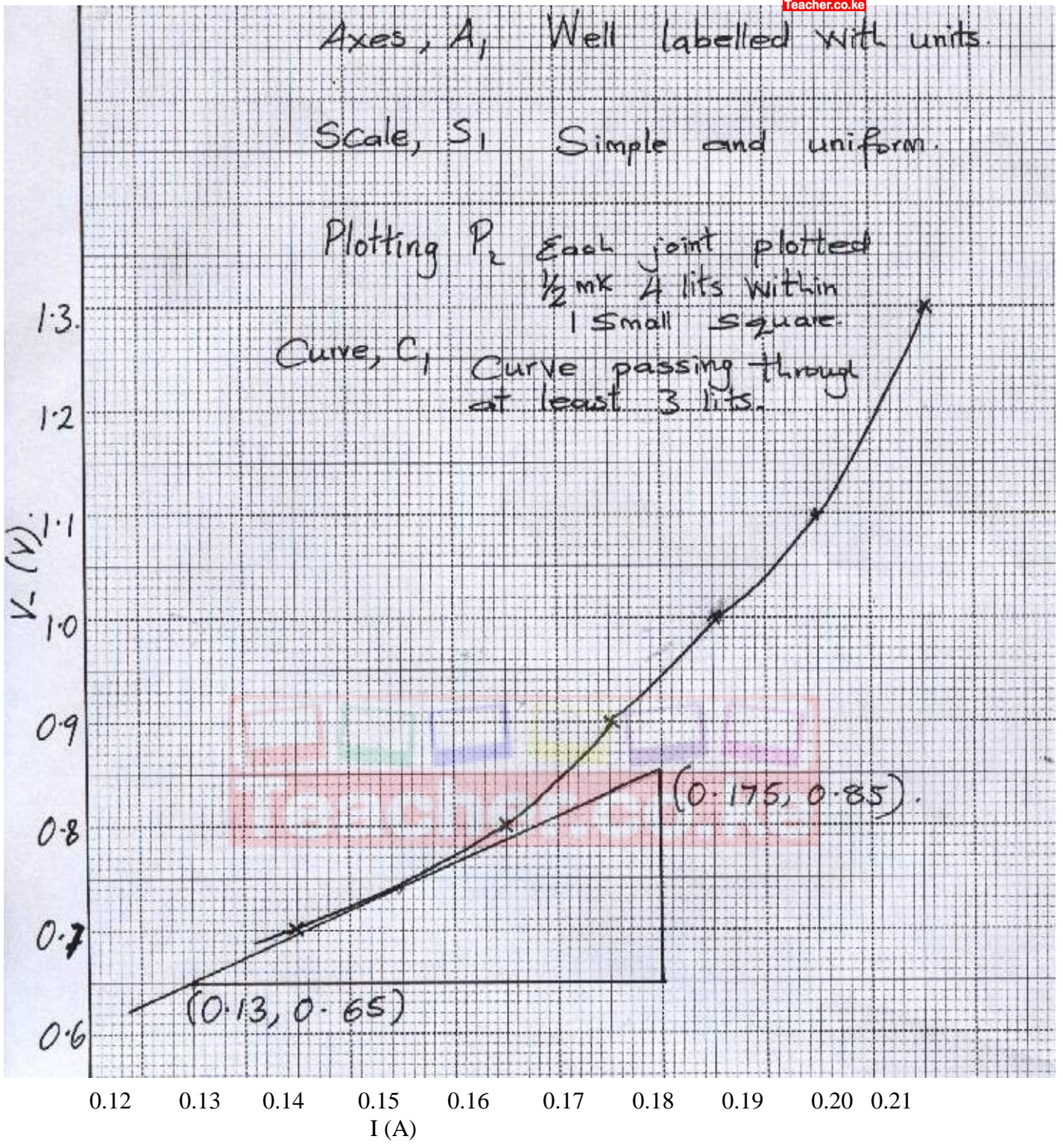
$$\text{Or } 4.4444 \Omega \quad \checkmark 1 \text{ For correct evaluation to 2 d.p rounded or truncating}$$

$$\checkmark \frac{1}{2} \text{ For units}$$

***N/B if curve is wrong***

***i.e Co, this part is awarded zero.***





b)  $x = 1.5 - 2.0$  cm ✓ 1 to 1 d.p