PHYSICS PAPER 3
MARKING SCHEME

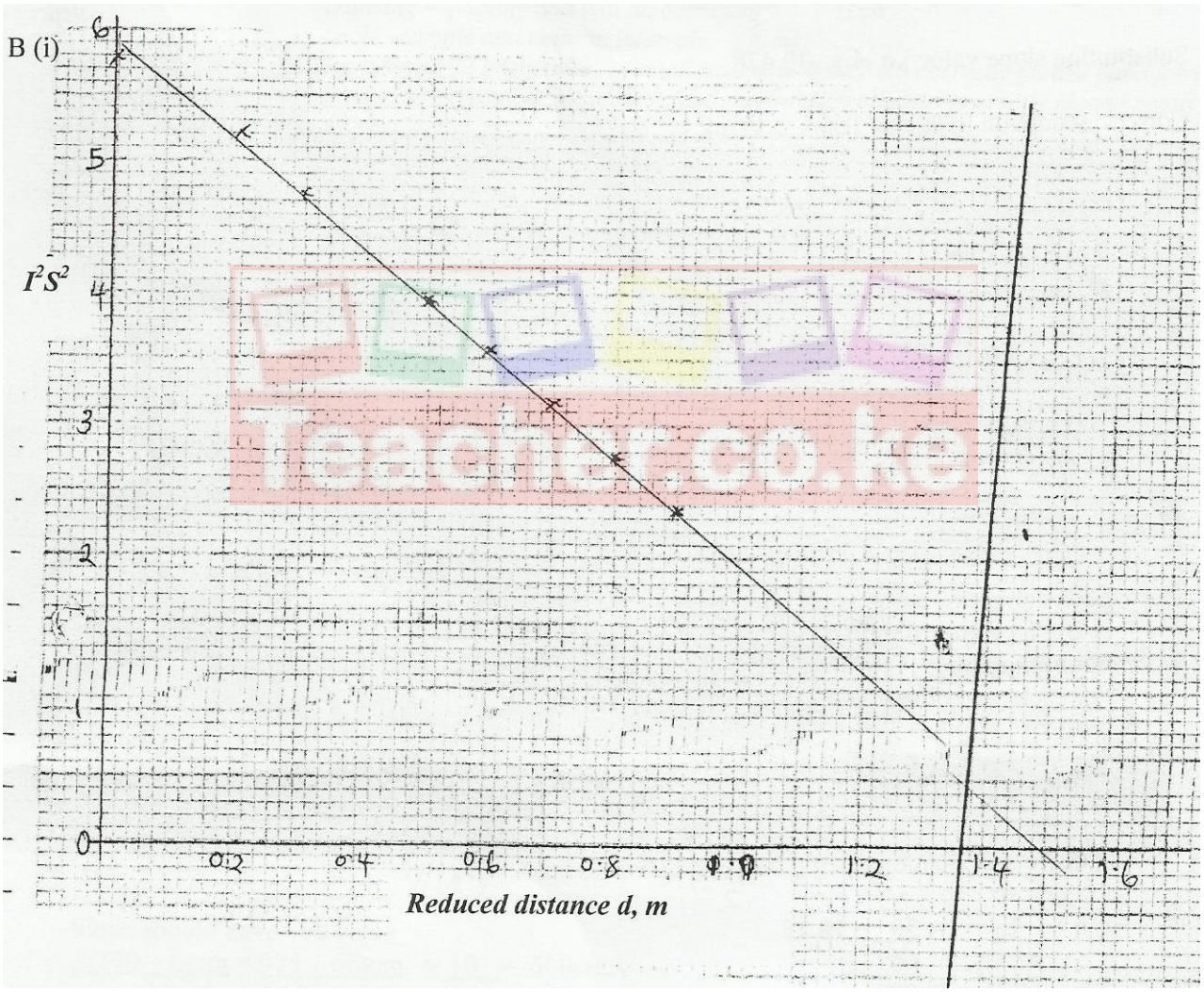
1. s

d,m	0	0.2	0.3	0.5	0.6	0.7	0.8	0.9
Time for 10 oscillations,(s)	24.08	22.80	21.77	19.87	18.85	17.77	16.62	15.39 ± 2
Period, T,(s)	2.408	2.280	2.177	1.987	1.885	1.777	1.662	1.539
Period^{2}T^2,(S^2)	5.800	5.200	**4.739**	**3.948**	**3.553**	**3.158**	**2.762**	**2.368**

N.B;

- t(s) values should reduce and to atleast 2d.p at 1 mk for each correct value up max of 5 mks
- T,s should be correctly calculated to atleast 3d.p more 5 correct values 1 mk
- 4 and 5correct values ½ mk
- less than 4 correct values 0mk

b) i)



- Label (1 mk) – quantity and unit a must for each axis
- Sclae – (1 mk) – simple and uniform intervals on both axes
- plotting (2 mks) – Each candidate plotted point to within small square on grid according candidates scale ½ mk for maximum of 2 mks
- line (1 mk) – The line should have a negative slope and pass through atleast 3 correctly plotted points

ii) Slope

When line is marked correct

Intervals on line ½ mk

Substitution in $\frac{\Delta y}{\Delta x}$ ½ mk

correct evaluation to 3 d.p (1 mk)

(0.1 5.5) and (0.6 3.5)

$G = \frac{3.5-5.5}{0.6-0.1} = -\frac{2}{0.5} = -4$

c) i) Extending line till it cuts x-axis (1 mk)

Correct reading of L to within one small square (1 mk)

Accuracy $1.3 \leq L \leq 1.7$m (1 mk)

ii) Stating or implying slope, $G = \frac{-39.478}{5}$

Substituting slope value i.e -4 = $\frac{-39.478}{5}$ (½ mk)

Correct evaluation to atleast 1 d.p ½ mk

Accuracy $9..0 \leq S \leq 11.0$ (½ mk)

2. Part 1

- L_1cm L_2 cm $\frac{L1}{L2}$

  60 50.0 ± 2 0.60

  60 27.5 ± 1 2.18
- Each correct L_2 value ½ mk (max 1mk)
- N/B – L_2 values should be to 1 d.p
- for each correct evaluation of $\frac{L1}{L2}$ to 2 d.p ½ mk (max 1 mk)
- For each correct value of $f = \frac{L1}{M+1}$ correctly calculate to1 dp

  Getting average $\frac{f_1+f_2}{2}$ be substitution of f values ½ mk

  Correct evaluation to 1d.p of $\frac{f_1+f_2}{2}$ ½ mk

  $f_1 = \frac{L1}{M+1} = \frac{30}{1.6} = 18.75$

  $f_2 = \frac{60}{3.18} = 18.87$

  $\frac{f_1+f_2}{2} = \frac{18.75+18.87}{2} = 18.81$

  Labelling – quantity and unit on both axes (1 mk)
- scale – simple and uniform intervals (1 mk)
- Plotting – plot to accuracy of small square at ½ mk each correctly plotted point for max 2
- Line – should have negative slope and pass through atleast 3 correctly plotted points.

Part II

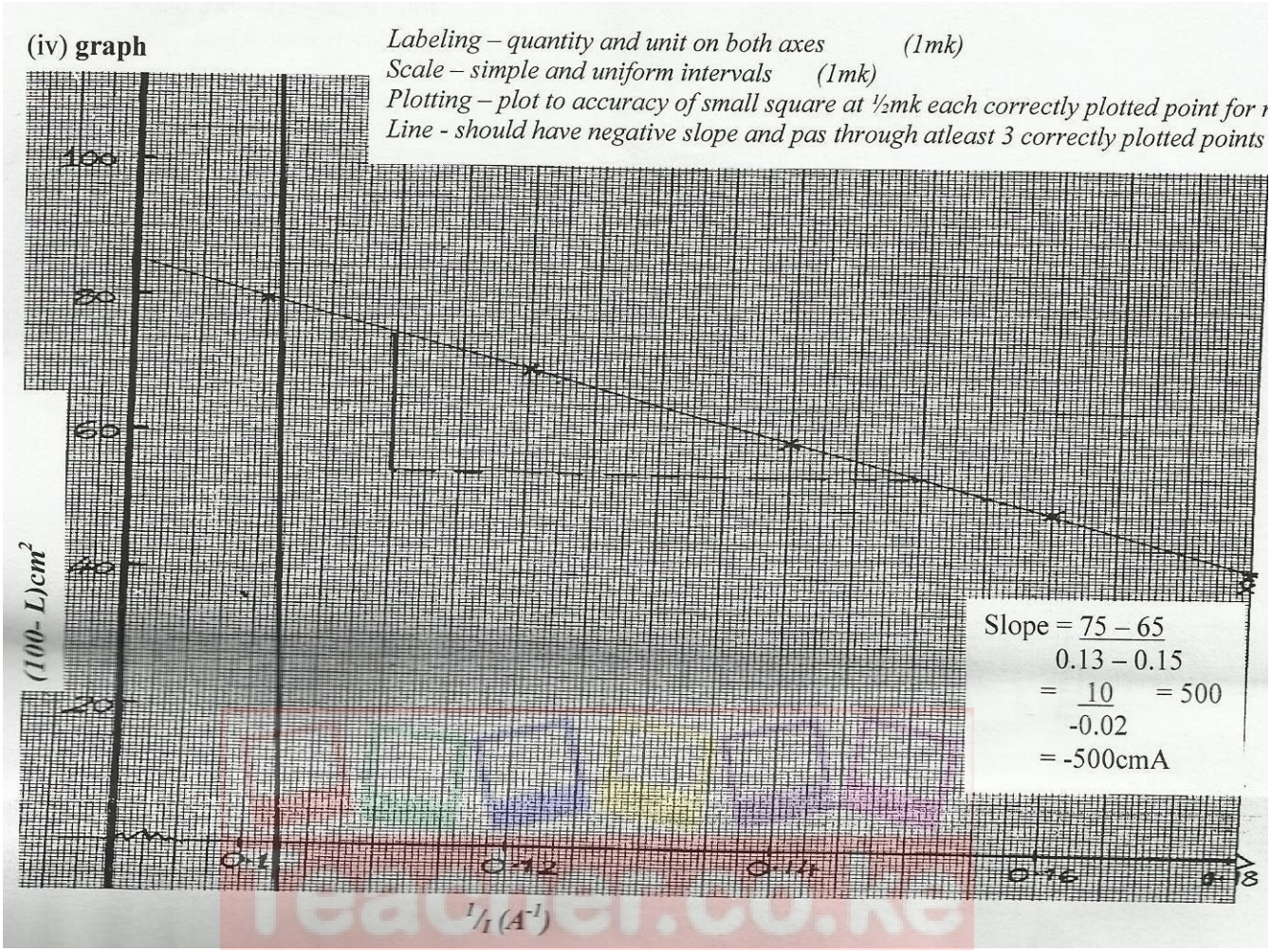
ii)

Length L(cm)	20	30	40	50	60	70	
Length (100-L)cm	80	70	60	50	40	30	
Current I(A)	0.10	0.12	0.14	0.16	0.18	0.2	±0.02
$\frac{1}{I}$ (A^{-1})	10.00	8.33	7.14	6.25	5.55	5.00	

- For (100 – L) award 1 mk for all values correct
- for current, award ½ mk @ correct value
- (Total marks=3mks). Values should be correct to at least 2d.p

0 – 3values correctly evaluated 0mks
4 & 5 values correctly evaluated ½ mk
6 values correctly evaluated 1 mk

iv)



b) slope should have –ve value

$\frac{\Delta(100-L)cm}{\Delta\frac{1}{I}A^{-1}} = \frac{(975-65)cm}{0.13-0.15} = \frac{10}{-0.02}$ = -500cmA

Intervals on line (1 mk)

Substitute of intervals in $\frac{\Delta y}{\Delta x}$ (1 mk)

Correct evaluation to nearest whole number (1 mk)

c) K = $\frac{S \times 1.5 \times d^2}{4} = \frac{500 \times 1.5 \times (0.08)^2}{4}$

= 1.2

Substitution of values (1 mk)

Correct values to at leat 1 d.p 1mk