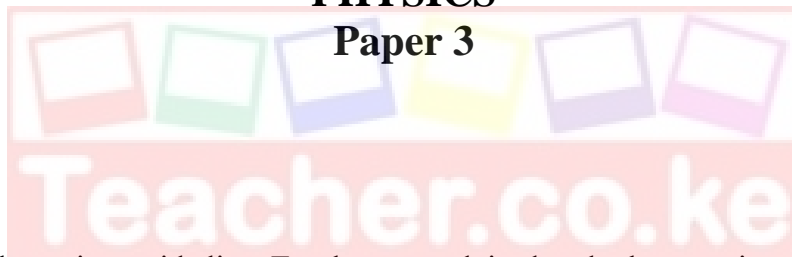


232/3
PHYSICS
PAPER 3
(PRACTICAL)

MARKING SCHEME

PHYSICS

Paper 3



N.B

This marking scheme is a guide line. Teachers are advised to do the experiments using the same apparatus as those used by the student and prepare their marking schemes

Questions

1. a) Wire used copper diameter 1.2 mm

Angle θ^0	Time 't' for 10 oscillations (s)	Period T (s)	Frequency f (Hz)	f^2 (Hz) ²	$\text{Cos} \left(\frac{\theta}{2} \right)$
50	4.80	0.480	2.08	4.34	0.906
60	5.24	0.524	1.91	3.64	0.866
70	5.63	0.563	1.78	3.17	0.819
80	5.85	0.585	1.71	2.9	0.766
90	6.02	0.602	1.66	2.76	0.707
100	6.45	0.645	1.55	2.40	0.643

1 mk for 5
t correct
error ± 0 .

1 mk for all values
 $\frac{1}{2}$ mk for 3 – 5
Otherwise non

1 mk for all
values correct

1 mk for all
values correct

1 mk for all
correct values

- Award a bonus mark for accuracy and consistency in the use o decimal points (Total 8 mks)

d) i) See graph

Label axis – 1mk

Appropriate scale – 1mk (uniform)

Total 5 mks

Plotting – 2 mks

½ mk for every correct (½ × 4)

Plotted point

ii) Straight line – 1 mk passing through at least 3 points obtained

$$\text{Gradient} = \frac{\Delta y}{\Delta x} = \frac{2.90 - 2.20}{0.760 - 0.604} = \frac{0.70}{0.156} \quad (1 \text{ mk}) \text{ Reading from the graph}$$

$$= 4.487 \quad (2 \text{ mks}) \text{ with or without units } (\text{Hz})^2 \text{ or cycles}^2/\text{sec}^2 \text{ or } \text{s}^{-2}$$

- not wrong units

$$\text{iii) } 4.487 = \frac{150}{4\pi^2 L} \quad (1 \text{ mk})$$

$$Z = \frac{4.487 \times 4 \times (3.14)^2 \times 0.15}{150} \quad (1 \text{ mk}) \text{ correct substitution}$$

$Z = 0.177$ (1 Mk) – If a student uses values obtained from the table award
1 Mk only for correct value of z

2. c)

Length L (cm)	20	30	40	50	60	70
Voltage V (v)	1.29	1.33	1.38	1.42	1.44	1.46
Current I (A)	0.28	0.24	0.21	0.16	0.14	0.12
$\frac{V}{I}$ (ohms)	4.607	5.542	6.571	8.875	10.28	12.17

d) Graph

Axes - 1✓

Scale - 1✓

Plotting - 2✓ (½ each)

Line - 1 ✓

$\frac{\Delta y}{\Delta x}$

e) Gradient $\frac{\Delta y}{\Delta x}$ ✓ correct interval

$$= \frac{(9.5 - 7.25)}{(53.5 - 40)} \quad \checkmark \text{ Correct evaluation}$$

$$= \frac{2.25}{13.5}$$

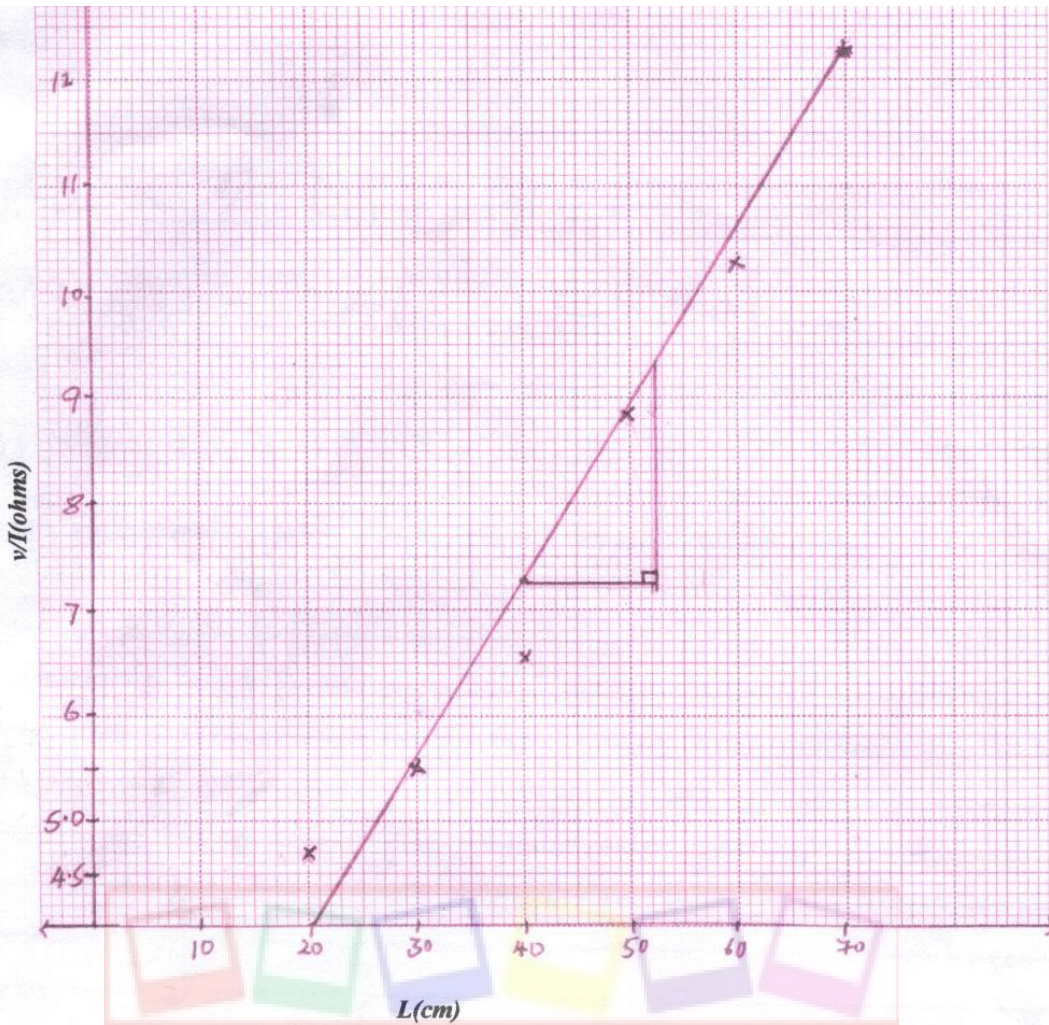
$$= 0.1667 \quad \checkmark \text{ accuracy (student's value)}$$

f) $R = 100 \times 0.16667$ ✓ substitution

$$= 16.667 \quad \checkmark \text{ evaluation}$$

g) (0.30 – 0.50) mm ✓ 2 d.p.

$$\text{h) } \rho = \frac{\pi D^2 R}{4} = \frac{3.14 \times (0.0004)^2 \times 16.667}{4} \quad \checkmark = 0.00000208 \quad \checkmark$$



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