

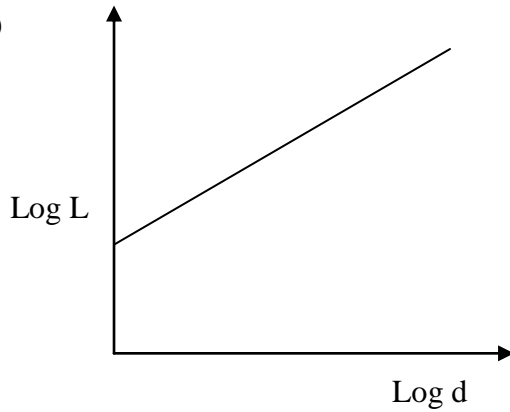
PHYSICS 233/3
MARKING SCHEME

1 (a) $h_0 = 92 \pm 3 \text{ mm}$

(d)

Length L(mm)	900	800	700	600	500 \checkmark
Height h(mm)	83	85	87	90	92 \checkmark
Depression d($h_0 - h$)mm	9	7	5	2	0 \checkmark
Log L	2.95	2.95	2.85	2.85	2.70 \checkmark
Log d	0.95	0.85	0.70	0.30	0 \checkmark

(e)



Axes – labeled A1
Scale – appropriate S1
Plotting – 4-5 point P2
- 2-3 points P1
Less than 2 P0

Line – straight through 3 correctly plotted points L1

(f) (i) correct intervals $\frac{\Delta \log L}{\Delta \log d} \checkmark 1$

Correct evaluation $\checkmark 1$
Accuracy (0.13 – 0.53) $\checkmark 1$

(ii) $Y = 1/S$

Correct substitution $\checkmark \frac{1}{2}$
Correct evaluation (2dp) $\checkmark \frac{1}{2}$

(iii) $G =$ correct extrapolation

Correct value from graph $\checkmark \frac{1}{2}$
Accuracy (2.5 – 2.7) to 1 dp $\checkmark \frac{1}{2}$

(iv) $K =$ correct substance $\checkmark \frac{1}{2} \text{ mk}$

Correct evaluation $\checkmark \frac{1}{2} \text{ mk}$

2. PART A

(a) (i) $d = 0.350 \text{ mm} = 3.5 \times 10^{-4} \text{ m} \checkmark \frac{1}{2} \text{ mk}$

(ii) $E = 1.5 \text{ v} + 0.1 \text{ v} \checkmark \frac{1}{2} \text{ mks}$

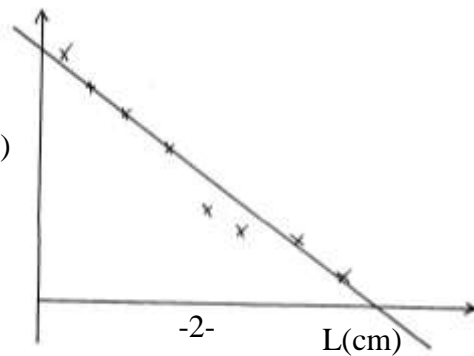
(b) (i)

L (cm)	2.5	5.0	7.5	10	15	18	20	30	40	50
p.d(volts)	0.70	0.75	0.80	0.90	1.00	1.00	1.05	1.15	1.20	1.25 $\checkmark \checkmark$
Current I (A)	0.55	0.50	0.46	0.40	0.34	0.32	0.31	0.25	0.22	0.18 $\checkmark \checkmark$
IV (Watt)	0.385	0.375	0.368	0.360	0.340	0.320	0.326	0.28	0.364	0.225 \checkmark

5mks

(ii) Graph

1V
(watts)



Scale 1
Plots 2
Line 1
Axes 1

(iii) $L_0 = 63$ cm (students x – intercept correctly read) 1mk

(c) (i) $V = 1.30 \sqrt{1/2}$

$I = 0.17A \sqrt{1/2}$

(ii) $V = \frac{E - V}{I}$

$= \frac{1.5 - 1.3}{0.17} = 1.17 \Omega \sqrt{(\pm 0.2)}$

(d) $e = \frac{\pi r d^2}{4 L_0}$

$= \frac{\pi \times 1.176 \times (3.5 \times 10^{-4})^2 \sqrt{1}}{4 \times 0.63}$

$1.796 \times 10^{-7} \Omega m \sqrt{1}$

PART B

(f) $V_1 = 26 \text{ cm}^3$ or $26m \text{ iv } 1/2$

(g) $l = 30.8 \text{ cm } \sqrt{1/2}$

(h) $K = 30.8$

$10 \times 3.142 \sqrt{1}$

$= 0.9803 \text{ cm}$

K is the radius of the 50g mass

(i) $Q = \frac{V_1 - 20 \sqrt{1}}{50}$

$= \frac{26 - 20}{50}$

$= 0.12 \text{ cm}^3 \cdot g \sqrt{1}$

The reciprocal of q gives the density of the 52g brass mass

Proof $1/q = 1/0.12$

$= 8.333 \text{ g / cm}^3$

