

4.6.3 Physics Paper 3 (232/3)

QUESTION ONE

PART A

(a) $d = 0.35 \pm 0.02 \text{ mm}$ (1 mark)

$d = 0.00035 \text{ m}$ $(3.5 \pm 0.2) \times 10^{-4} \text{ m}$

(d) $D = 0.75 \pm 0.05 \text{ cm}$ $0.80 \pm 0.02 \text{ cm}$ (1 mark)

$D = (8.0 \pm 0.2) \times 10^{-3} \text{ m}$

(e) $N = 26 \pm 1 \text{ turns}$ (1 mark)

(f) $X = 3.0 \pm 0.2 \text{ cm}$ (1 mark)

$X = (3.0 \pm 0.2) \times 10^{-2} \text{ m}$

(g) $c = \frac{0.4}{x}$
 $= \frac{0.4}{0.03}$
 $= 13.00 \pm 2 \text{ Nm}^{-1}$ (1 mark)

(h) $n = \frac{c8ND^3}{d^4}$
 $= \frac{13.33 \times 8 \times 26 \times (8.0 \times 10^{-3})^3}{(3.5 \times 10^{-4})^4}$
 $= (9.2 \pm 0.2) \times 10^{-10} \text{ Nm}^{-2}$ (2 marks)

(i) $t = 9.85\text{s} \pm 1.00$ (1 mark)

$T = 0.44\text{s}$ (1 mark)

(j) $Z = \frac{4\pi^2 m}{T^2}$
 $Z = 18.00 \pm 2$ (2 marks)

PART B

(m)

Distance U cm	12	16	20
Distance V cm	5.2	4.8	4.5
Constant $y = \frac{uv}{u+v}$	3.6	3.7	3.7

(4 marks)

(n) $m = \frac{y_1 + y_2 + y_3}{3} \approx 3.7$

(1 mark)

(o) (i) $h = 5.0 \pm 0.1 \text{ cm}$

(1 mark)

(ii) $P = 2.2 \pm 0.1 \text{ cm}$

(1 mark)

(iii) $f = 1.30 \pm 0.03$

(2 marks)

QUESTION TWO

(a) $d = 3.0 \pm 0.1 \times 10^{-4} \text{ m}$

(1 mark)

$3.0 \pm 0.1 \times 10^{-1} \text{ mm}$

(b) $E_0 = 3.1 \pm 0.1 \text{ V}$

(1 mark)

(d) (i) $I = 0.35 \pm 0.05 \text{ A}$

(1 mark)

Table 1

Length RN (m)	0.1	0.2	0.3	0.4	0.5	0.6
P.d (V)	0.45	0.80	1.20	1.60	1.90	2.25
Resistance $(\frac{V}{I}) (\Omega)$	1.3	2.3	3.4	4.6	5.4	6.4

(4 marks)

(e)

Plotting of points 2

Axis labelled with units 1

Scale suitability 1

Straight line 1

5 marks

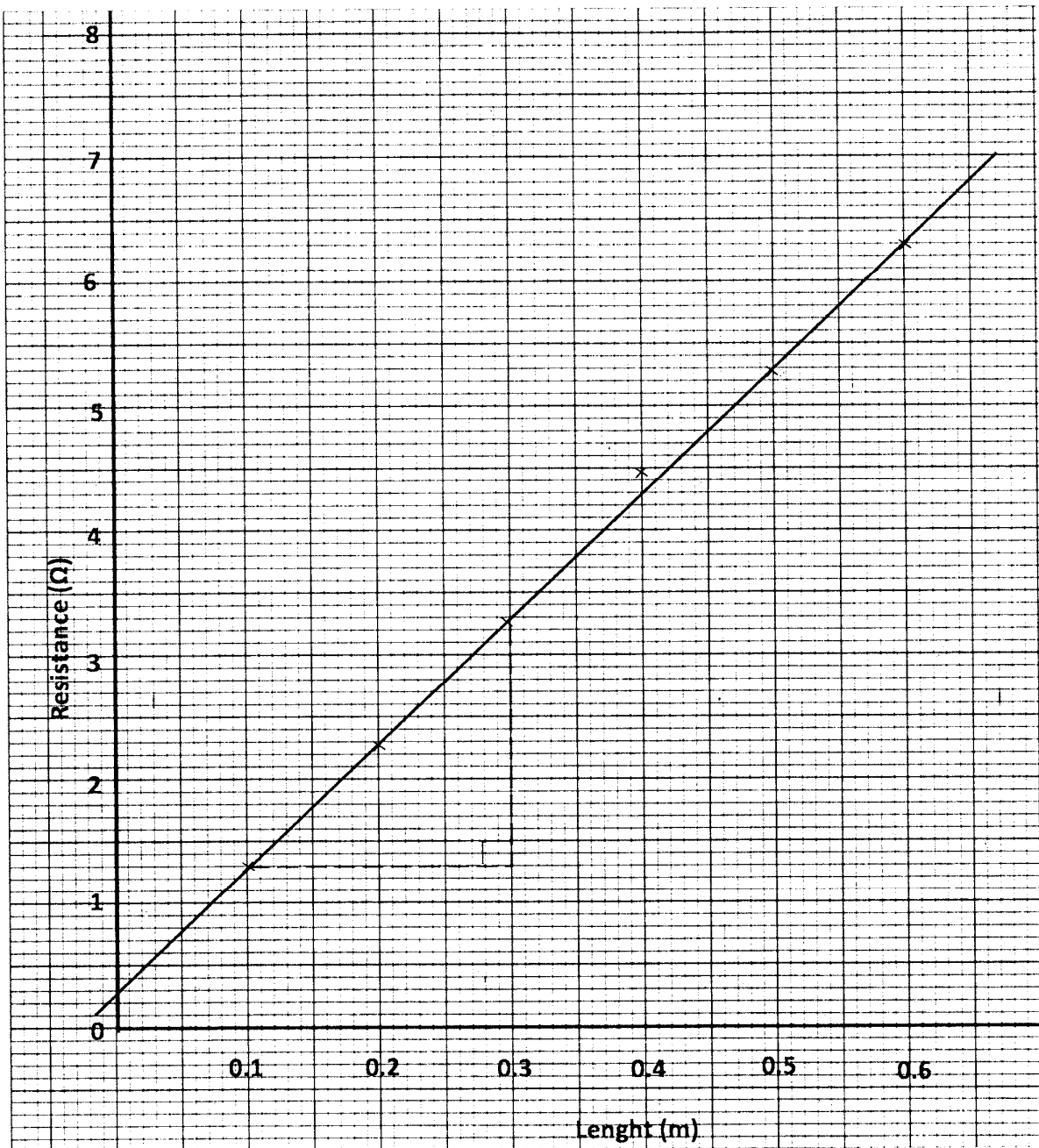
(f) (i) Slope = $\frac{\Delta R}{\Delta l}$ correct intervals (1 mark)

$$= \frac{3.4 - 1.3}{0.3 - 0.1}$$

$$= \frac{2.1}{0.2}$$

S = $10.5 \pm 0.2 \Omega\text{m}^{-1}$ (1 mark)

correct unit (1 mark)



(f) (ii) $S = \frac{4K}{\pi d^2}$ correct evaluation (1 mark)

$$k = \frac{\pi d^2 s}{4}$$

correct value (1 mark)

$$= \frac{\pi \times (3.0 \times 10^{-4})^2 \times 10.5}{4}$$

$$= 74.22 \times 10^{-8}$$

$$= 7.422 \pm 0.2 \times 10^{-7} \Omega \text{ m}$$

OR

$$= 7.422 \pm 0.2 \times 10^{-4} \Omega \text{ mm}$$

(g) $t = \frac{E_0 - Vn}{I}$ correct evaluation (1 mark)

$$= \frac{3.0 - 2.25}{0.35}$$
 correct value (1 mark)

$$= 2.0 \pm 0.5 \Omega$$
 ignore unit