

PHYSICS 232/3 MARKING SCHEME

Q1.

(a) Balance point = 49.5cm allowance of 0.5cm on the higher side. ✓ 1 mark

(b) χ - 17.8cm ✓ 1 mark

D - 40.5cm ✓ 1 mark

$$W_1 = \frac{1 \times 17.8}{40.5} \checkmark = 0.4395 \checkmark 2 \text{ marks}$$

$$U_w = 0.5 - 0.4395 = 0.0605N \checkmark 1 \text{ mark}$$

(c) (i) χ = 18.4cm ✓

$$(ii) W_2 = \frac{1 \times 18.4}{40.5} = 0.4543N \checkmark 1 \text{ mark}$$

$$U_L = 0.5 - 0.4543 \checkmark 1 \text{ mark}$$

$$= 0.0457N$$

(d) R.D = 0.755 ✓

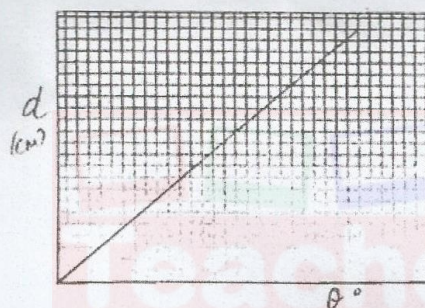
(e) Density = 0.755 x 1000
= 755kg/m³ ✓

PART B (i)

θ (deg)	25	35	40	45	55	60	65
d(cm)	1.2	1.8	2.1	2.15	3.1	3.6	4.2

Each value ½ mark – maximum 3 marks

j(i)



Axis – Labelled with units ✓ 1 mark

Scale – Simple and uniform ✓ 1 mark

Plotting – 4 points - ½ mark each maximum 2 marks

Line through the origin ✓ 1 mark

j(ii) d = 0cm.

Question 2

(b) $E = 1.50V \pm 0.1V$

(c) $I = 0.2A \pm 0.05A$

$$V = 1.50V \pm 0.1V$$

(d) $1.54 = 1.52 \pm 0.2r$ - correct substitution of E, V and A – ½ mk

$$r = 0.02/0.2$$

$$r = 0.1 \text{ ohms} - \text{correct evaluation} - \frac{1}{2} \text{ mk}$$

(Candidates values)

$1.52 = 0.2 \times$ - correct substitution of V and I in the equation $V = IX$ – ½ mk

$$X = \underline{1.52}$$

$$0.2$$

$$= 7.6 \text{ ohms} - \text{correct evaluation of } X - \frac{1}{2} \text{ mk}$$

Number of 10Ω resistors	One	Two	Three	Four	Five	Six	
a(cm) 1mk each for 4 correct pts	42	60	70	76	81	$83 \pm 2\text{cm}$	4mks
$\frac{1}{R}\Omega^{-1}$ All correct $\frac{1}{R}$ (1mk) at least 2d.p	0.1	0.05	0.03	0.025	0.02	0.0167	1mk
$\frac{1}{a} \text{ (cm}^{-1}\text{)}$ All correct $\frac{1}{a}$ (1mk) 3d.p	0.024	0.0167	0.014	0.013	0.012	0.012	1mk

(i) Determining the slope m.

$$\text{Slope} = \frac{(2.14 - 1.7)}{(8.20 - 5.20)} - \text{correct } \frac{\Delta y}{\Delta x} - \frac{1}{2} \text{ mk}$$

$$= \frac{0.44}{3.0} - \text{correct evaluation} - \frac{1}{2} \text{ mk}$$

$$= 0.147 \text{ cm} - \text{Accuracy: } (0.140 - 0.150) \text{ cm} - 1\text{mk}$$

(j) Slope = w/k

$$0.147 = w/100 - \text{Correct substitution} - 1\text{mk}$$

$$w = 14.7\Omega - \text{Correct evaluation} - 1\text{mk}$$

(Student's value)

- Axes – correct labeled with units – 1mk
 - Scale – simple and uniform – 1mk
 - Plotting at least 4 points correctly – 2mks
within 1 small square @ $\frac{1}{2}$ mk
 - A straight line of best fit – 1mk
- (5mks)

