

Name of the Student: _____

Max. Marks : 15 Marks

Time : 15 Minutes

Mark Schemes

Q1.

- (a) circuit diagram to show:
 ammeter in series, voltmeter in parallel **(1)**
 variable source (e.g. battery + rheostat or potential divider) **(1)**

2

(b) (i) $R_x = \frac{0.70}{12.5 \times 10^{-3}} = 56 \, \Omega$ **(1)**

(ii) $R_x = (\text{e.g.}) \frac{0.90}{39 \times 10^{-3}} = 23 \, (\Omega)$ **(1)**

R_x depends on current (or voltage) $\therefore$ non-ohmic

3

- (c) (i)

col C	col D
0.15	2.53
0.20	2.83
0.25	3.09
0.30	3.37
0.35	3.66
0.40	3.94

four pairs of values correct **(1)**

all six pairs correct and col D to no more than 4 s.f **(1)**

- (ii) axes labelled **(1)**
 suitable scales chosen **(1)**
 at least five points plotted correctly **(1)**
 acceptable straight line **(1)**
- (iii) $k = \text{gradient}$ **(1)**

$$\text{gradient} = \frac{3.95 - 1.68}{0.40} = 5.7 \, (\text{V}^{-1}) \, \mathbf{(1)}$$

intercept on y-axis = $\ln A$ **(1)**

(intercept = 1.68 gives) $A = e^{1.68} = 5.4 \, (\text{mA})$ **(1)**

unit for k or A correct **(1)**

- (iv) the points define a straight line **(1)**
valid over given range **(1)**

max 10

[15]