

Name of the Student: _____

Max. Marks : 16 Marks

Time : 16 Minutes

Mark Schemes

Q1.

- (a) circuit diagram to show:
 wide end of conducting strip to – of battery, narrow end to + **(1)**
 voltmeter between wide end and probe **(1)**

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- (b) resistance gradient increases as x increases **(1)**
 because strip becomes narrower (as x increases) **(1)**
 current constant throughout strip **(1)**
 voltage gradient = current \times resistance gradient, so
 voltage gradient increases as x increases **(1)**

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- (c) (i)

$(2l - x)$	$\ln(2l - x)$
(0.700)	(-0.357)
0.60(0)	-0.511
0.53(0)	-0.635
0.47(0)	-0.755
0.44(0)	-0.821
0.42(0)	-0.868

1st column correct to 2 s.f. **(1)**
 2nd column correct to 3.s.f. **(1) (1)**
 (only 4 values correct, **(1)**)

- (ii) suitable scales **(1)**
 axes labelled and units included **(1)**
 5 points correctly plotted **(1)**
 acceptable straight line **(1)**
 straight line confirms equation because equation is of form
 $y = mx + c$ with negative gradient **(1)**

- (iii) gradient = $(-)\frac{10.5}{0.68} = (-) 15.4 \text{ (V) (1)}$

1.44 $V_1 = 15.4$ gives $V_1 = 11 \text{ V (1)}$ ($10.7 \pm 0.2 \text{ V}$)
 [alternative: $V = V_1$ when $x = l$ and $\ln(2l - x) (= \ln 0.4) = 0.92$ **(1)**
 at $\ln(2l - x) = 0.92$, graph gives $V_1 = 11 \text{ V (1)}$ ($10.7 \pm 0.2 \text{ V}$)]

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[16]