

Electrical Circuits

Mark Scheme 6

Level	IGCSE
Subject	Physics
Exam Board	CIE
Topic	Electricity and Magnetism
Sub-Topic	Electrical Circuits
Paper Type	Alternative to Practical
Booklet	Mark Scheme 6

Time Allowed: 54 minutes

Score: /45

Percentage: /100

- 1 (a) table:
 l in m [1]
 V in V, I in A, R in Ω (words or symbols) [1]
 R values 1.6875, 3.4375, 5.03125 (2 or more significant figures) [1]
 R values consistent 2 or 3 significant figures [1]
- (b) R (directly) proportional to l o.w.t.t.e.
numerical example given, allow two ratios [1]
idea of within limits of experimental accuracy [1]
- (c) prediction $10 \rightarrow 10.35$, no unit needed [1]
working shown [1]
- (d) two from:
wire gets hot / burns out
meter damaged
wire gets floppy / expands
higher meter readings / readings off scale
power source cuts out / fuses
resistance of wire increases [2]
- [Total: 11]**

- 2 (a) correct symbol [1]
correct position [1]
- (b) table:
 V/l values correct 8.35, 3.58, 2.08, 1.39, 1.00 [1]
consistent 2 or 3 significant figures [1]
unit V/m [1]
- (c) statement matches readings (expect NO) [1]
justification matches statement and by reference to results
 V/l not constant, as l increases V decreases [1]
- (d) any one of:
check for zero error
avoidance of parallax error explained
switch off between readings
repeats [1]
- [Total: 8]**

- 3 (a) diagram:
correct symbols for ammeter, voltmeter and lamps [1]
(lamp – cross at least $\frac{1}{2}$ diameter by eye) (ignore power source) [1]
voltmeter position correct [1]
lamps in parallel in a correct circuit (e.g. single voltmeter) [1]
- (b) table:
V, A, Ω (any in symbols, words or a mixture) [1]
Correct R values 6.13, 6.00, 3.11 [1]
Consistent 2 or 3 significant figures [1]
- (c) statement matches readings (expect NO) [1]
justification matches statement
and by reference to resistance results (don't need numbers) [1]

[Total: 8]

- 4 (a) 0.3 – 0.31 [1]
- (b) Ω , A [1]
10.1 [1]
- (c) correct calculation of $0.5I_0$ shown (ecf) [1]
 $10(\Omega)$ [1]
- (d) diagram:
resistors in parallel [1]
voltmeter symbol [1]
voltmeter position [1]

[Total 8]

- 5 (a) 2 – 2.1 (V) [1]
- (b) R in Ω , V in V (symbols or words) [1]
(ii) 10.1 [1]
- (c) graph:
axes labelled and scales suitable (origin included) [1]
all plots correct to nearest $\frac{1}{2}$ small square (must be visible) [2]
(-1 for first incorrect plot, -2 for second)
well judged best fit line/curve
(allow 3 good plots on line with one anomaly) [1]
thin (solid) line/neat plots to $<1/2$ square [1]
- (d) method clearly shown on graph
(extension follows trend of line/curve, can be dotted)
(contradictory calculation negates mark) [1]
 V correct to $\frac{1}{2}$ small square (ignore unit) expect 1.6 V approx [1]
(allow candidate value for a 'reasonable' attempt at a line
but not if clearly wrong trend or forced – e.g. to 2 or 0)

[Total: 10]