

# Electrical Circuits

## Mark Scheme 7

<b>Level</b>	IGCSE
<b>Subject</b>	Physics
<b>Exam Board</b>	CIE
<b>Topic</b>	Electricity and Magnetism
<b>Sub-Topic</b>	Electrical Circuits
<b>Paper Type</b>	Alternative to Practical
<b>Booklet</b>	Mark Scheme 7

**Time Allowed:** 53 minutes

**Score:** /44

**Percentage:** /100

- 1 (a) (i) voltmeter symbol [1]  
correct position [1]
- (ii) variable resistor/rheostat [1]
- (b) 2.2 marked [1]
- (c) correct values 6.11, 6.03, 6.12, 6.17, 6.09 [1]  
consistent 2 or 3 significant figures [1]
- (ii) V, A,  $\Omega$  [1]
- (iii) statement matches results (expect YES) [1]  
explanation matches statement (expect same within limits of experimental accuracy) [1]

[Total: 9]

- 2 (a)  $R$  values 0.553, 1.55, 2.74, 3.74, 4.92 [1]  
(2,3,4 or more significant figures) [1]  
Consistent 3 or consistent 4 significant figures for final four entries [1]
- (b) Graph: [1]  
Axes labelled and scales suitable (must include origin) [1]  
Plots correct to  $\frac{1}{2}$  square (-1 each error or omission) [2]  
Well judged str. line taking account of all points and reaching an axis [1]  
Thin line [1]
- (c) Statement proportional (wtte) or as  $x$  increases,  $R$  increases [1]  
Justification straight line through origin [1]
- (d) Clear indication of method on graph [1]  
Correct value to  $\frac{1}{2}$  square [1]
- (e) low current/switch off between readings [1]  
or add (variable) resistor/lamp  
or reduce voltage/power [1]

[Total: 12]

- 3 (a)–(c)
- |  |     |
|--|-----|
| table:   |     |
| V, A, $\Omega$                                   | [1] |
| V 1.8  | [1] |
| I 0.25   | [1] |
| R values 7.20, 3.46(3.5)                         | [1] |
| consistent significant figures for R (2 or more) | [1] |
- (d) y 0.48, 0.49, 0.5 (ecf) [1]  
 2/3 significant figures and no unit [1]
- (e) correct symbols and circuit (ignore power source symbol) [1]
- (ii) voltmeter position correct [1]
- (iii) control current/voltage/resistance/speed of motor [1]
- [Total: 10]**

- 4 Table:
- |  |     |
|--|-----|
| (a) Units V, A, $\Omega$ (symbol/word)     | [1] |
| R values 1.11, 2.19, 5.05, 9.55            | [1] |
| Consistent 2 or consistent 3 sig fig for R | [1] |
- (b) Yes (if within 10%) No (if not) [M1]  
 Circuit 1 and circuit 2 compared [A1]
- (ii) limit current (so temperature not increased)  
 OR switch off between readings  
 OR check for zero error  
 OR Repeats  
 OR Parallax error explained  
 OR Tapping meter [1]
- [Total: 6]**

- 5 Diagram: correct symbols for ammeter and voltmeter [1]  
correct symbols for resistor [1]  
correct circuit arrangement [1]

Table: units V, A (symbol/word) [1]

- (c) Prediction 1 Yes – close enough (or words to that effect)  
OR No – not close enough (or words to that effect) [1]  
Prediction 2 Yes – approximately half (or words to that effect) [1]

Resistance at connections  
Internal resistance of source/other sensible suggestion [1]

**[Total: 7]**