Electrical Quantities

Mark Scheme

Level	IGCSE
Subject	Physics
Exam Board	CIE
Topic	Electricity and Magnetism
Sub-Topic	Electrical Quantities
Paper Type	Alternative to Practical
Booklet	Mark Scheme 1

Time Allowed: **58 minutes**

Score: **/48**

Percentage: **/100**

Question	Answer	Marks
1(a)(i)	*R* values 1.60, 1.51, 1.35, 1.21 *R* values all to 2 significant figures or all to 3 significant figures.	**1** **1**
1(a)(*ii*)	Column headings m, V, A, Ω	**1**
1(b)	No; there is a current reading	**1**
1(c)	filament changes brightness, owtte increase / decrease / change in temperature of filament / lamp	**1** **1**
1(d)(i)	Variable resistor (rheostat)	**1**
1(d)(ii)	Correct symbol for variable resistor Correct diagram, with variable resistor in series with power supply	**1** **1**
		Total 9

2 **(a** arrow indicating 0.4 V [1]

arrow indicating 0.08 A [1

(b) graph:
- axes labelled with quantity AND unit [1]
- appropriate scales (plots occupying at least ½ grid) [1]
- plots all correct [1]
- well-judged line AND thin line, neat plots [1]

(c) **(i)** *G* present and triangle method seen using at least ½ line [1]

(ii) *R* in range 4.6 Ω to 4.9 Ω [1]

to 2 / 3 significant figures and with correct unit [1]

(d) statement matching graph with reference to straight line [1]

reference to passing through origin (within limits of experimental accuracy / owtte) [1]

(e) suitable change: [1]
e.g. reduce supply voltage / current,
use thinner / longer wire,
material with greater resistivity

[Total: 12]

3 **(a** correct symbol in parallel between crocodile clip and zero end of wire [1]

(b) R = 7.1(0), 6.22, 5.45, 4.7(0), 3.93 [1]

(c) Graph:
- axes labelled correctly, right way round and with units [1]
- suitable scales, plots occupying at least half grid in both directions [1]
- plots correct to within ½ small square [1]
- well-judged straight line, thin line, precise plots [1]

(d) G present and triangle method seen on graph [1]

(ii) r in range 7.4 – 8.5 [1]

2 or 3 sig. figs. AND unit Ω / m [1

[Total: 9]

4 **((i)** 1.9 (V) [1]

0.26 (A) [1]

(ii) R = 7.3 (7.3077) (Ω) accept any sig. figs. > 2, ecf allowed [1]

all units V, A, Ω correct, symbols or words [1]

(b) brightness increases (from X to Z) [1]

(c) one from:
- exact placement of S
- width of S
- battery running down / voltage changed
- wire/lamp getting hot
- resistance of lamp / wire changed [max 1]

(d) increases (note: if this mark is not scored, the next mark cannot be scored) [1]

V increases more quickly than I (accept greater rate)
or V increases proportionately more than I
or doubling V causes I to increase by less than double
allow gradient is increasing [1]

[Total: 8]

5 **(a) (i)** (cm, V, A) [no mark awarded]

(ii) Graph:
Axes correctly labelled with quantity and unit and correct way around [1]
Suitable scales – plots occupy at least half the grid [1]
All plots correct to ½ small square [1]
Good line judgement (ecf for curve if *d* plotted) [1]
Single, thin, continuous line [1]

(iii) Triangle using at least half of candidate's line clearly indicated on graph [1]
Evidence of subtraction seen [1]
G value 1.5 when rounded to 2 significant figures [1]

(b) Same as *G*, rounded to 2 or 3 significant figures [1]
unit Ω/ohms [1]

[Total: 10]