Electrical Circuits

Mark Scheme 3

Level	IGCSE
Subject	Physics
Exam Board	CIE
Topic	Electricity and Magnetism
Sub-Topic	Electrical Circuits
Paper Type	Alternative to Practical
Booklet	Mark Scheme 3

Time Allowed: **54 minutes**

Score: **/45**

Percentage: **/100**

1 **(a** all units correct: m, V, A, Ω – symbols and/or words [1]

(b) graph:
axes correctly labelled and correct orientation [1]
suitable scales, plots using more than half available axes [1]
all plots correct to ½ small square [1]
good line judgement, thin, continuous, [1]
note: do not allow 'blobs' greater than half square diameter

(c) triangle method shown on graph [1]
note: do not allow use of y/x if graph does not go to origin

G using large triangle/half of candidate's line used [1]
note: second mark can be given from coordinates used in equation if nothing shown on graph

(d) R_1 value to 2 or 3 significant figures – ignore unit [1]
note: this mark does not depend on actual value being correct

R_1 in range 5.8 to 6.2 Ω
OR accept $R_1 = G$ value if outside tolerance [1]

[Total: 9]

2 **(a** voltmeter in parallel with lamp **L** and with correct symbol [1]

(b)(c) table:
V = 1.7 (V) [1]
I = 0.18 (A) [1]
R = 9.4(4) ecf **(b)**, 7.6/7.58 with 2 or 3 sig. figs. [1]
all units correct (V, A, Ω) [1]

(d) statement matches results, with matching justification which refers to values being 'too different'/'difference beyond limits of experimental accuracy' o**w**t**t**e

(e) lamp in circuit 1 brighter than in circuit 2
<u>and</u> has greater resistance [1]

(f) correct circuit symbol for variable resistor (rectangle with strike-through arrow only) [1]

connected in correct series circuit [1]

[Total: 9]

3 **(a** table:
R values correct 0.61, 1.82, 3.16, 4.27, 5.48 [1]
all *R* values to 2 or 3 significant figures [1]
cm, V, A, Ω [1]

(b) graph:
axes correctly labelled [1]
suitable scales [1]
all plots correct to ½ small square [1]
good line judgement [1]
single, thin, continuous line [1]

(c) triangle method shown on graph [1]
using at least half of line [1]
G = 0.31to 0.35 2 or 3 significant figures [1]

[Total: 11]

4 **(a** **(i)** V_1 = 0.7 (V) [1]
I = 0.45 (A) [1]

(ii) R_1 = 1.56 or 1.6 (Ω) e.c.f. **(i)** [1]

(b) V_2 = 0.6 (V) and V_3 = 0.5 (V) c.a.o. [1]

(c) 1.8 (V) e.c.f. V_1, V_2, V_3 [1]

(d) correct symbols for ammeter, lamp, voltmeter [1]
correct parallel circuit with ammeter and voltmeter correctly connected [1]

(e) statement matches candidate's results and idea of within/beyond limits of experimental accuracy or that values are too far apart / too different [1]

(f) brighter [1]

[Total: 9]

5 **(a** correct symbol for voltmeter [1]

(b) (i) 2.59, 8.00, 3.91 [1]
consistent 2 or 3 sig. figs. [1]

(ii) units all correct (symbols or words) [1]

(c) statement matches result (expect 'No') [1]
R figures quoted appropriately and matching statement
(need to see too different o.w.t.t.e.) [1]

(d) correct parallel connection [1]

[Total: 7]