

Electrical Circuits

Mark Scheme 4

Level	IGCSE
Subject	Physics
Exam Board	CIE
Topic	Electricity and Magnetism
Sub-Topic	Electrical Circuits
Paper Type	Alternative to Practical
Booklet	Mark Scheme 4

Time Allowed: 56 minutes

Score: /46

Percentage: /100

- 1 (a) (i) 1.8 (V) [1]
0.3 (A) [1]
- (ii) $P_1 = 0.54$ (W) e.c.f. allowed [1]
- (iii)(iv)(v) $P_T = 1.59$ (or 1.6) W [1]
- (b) statement matches results (expect YES) e.c.f. allowed [1]
justification in terms of within or beyond limits of experimental accuracy o.w.t.t.e. [1]
- (c) diagram:
lamps in parallel, variable resistor in series with power supply, with correct symbols [1]
for variable resistor, lamps and voltmeter [1]
one voltmeter correctly positioned [1]
- (ii) vary current (or p.d.) [1]

[Total: 9]

- 2 (a) (i) 0.30 A c.a.o. unit needed (accept 0.3 A) [1]
- (ii) table:
 0.40 (accept 0.4) [1]
 1.33 (e.c.f. (a)(i)) accept any significant figures > 1 and recurring decimal [1]
- (b) graph:
 axes correctly labelled [1]
 suitable scales (x axis 2 cm = 0.2 m/0.25 m) [1]
 all plots correct to ½ small square [1]
 good line judgement [1]
 thin continuous line, carefully plotted points not large 'blobs' [1]
- (c) *l* correct to ½ square – must see evidence on graph paper
 condone no / incorrect unit, ignore significant figures [1]
- (d) 9.5 to 10.5 (Ω) ignore significant figures [1]

[Total: 10]

- 3 (a) correct symbol connected in parallel [1]
- (b) (i) axes labelled, with units [1]
 appropriate scales (plots occupying at least ½ grid) [1]
 plots correct to ½ square [1]
 best-fit line and thin, neat line, neat plots [1]
- (ii) triangle method seen on graph [1]
 large triangle (at least 1/2 candidate's line) [1]
- (iii) *R* correct from *M* and in range 0.7 to 0.8 [1]
 2 or 3 significant figures and unit Ω (symbol or word) [1]

[Total: 9]

- 4 (a) (i) $V_1 = 1.9$ [1]
 $I_1 = 0.3$ [1]
 Units V and A both correct [1]
- (ii)/(iii) $R_P = 6.33$ and $4R_P = 25.3/25.2$ to 2 or 3 sig. figs. [1]
 Ω [1]
- (b) $R_S = 23.8 (\Omega)$ or $24 (\Omega)$ [1]
- (c) Correct statement (from candidate's work) [1]
 with matching justification (idea of within or beyond experimental accuracy)
- (d) Circuit: correct symbols for ammeter, voltmeter and lamp in correct series circuit [1]
- (e) (i) Change/control current/voltage [1]
 (ii) To obtain range of readings (or wtte) [1]
- [Total: 10]**

- 5 (a) Correct symbols for ammeter, voltmeter and lamps [1]
 Ammeter and voltmeter in correct positions [1]
 Correct parallel circuit [1]
- (b) (i) and (ii) $V_A = 1.9(V)$ $R_A = 2.9(2) (\Omega)$ [1]
 Units V and Ω [1]
- (iii) Pointer at correct position (0.65) [1]
- (c) No mark awarded
- (d) Statement matches readings (expect YES) [1]
 Justified with idea of experimental inaccuracy [1]
 (expect 'close enough', owtte)

[Total: 8]