Electrical Circuits

Mark Scheme 5

Level	IGCSE
Subject	Physics
Exam Board	CIE
Topic	Electricity and Magnetism
Sub-Topic	Electrical Circuits
Paper Type	Alternative to Practical
Booklet	Mark Scheme 5

Time Allowed: **57 minutes**

Score: **/47**

Percentage: **/100**

1 **(a** Voltmeter symbol and position correct [1]

(b) Pointer in correct position [1]

(c) (i) I_1 = 0.84 A, I_2 = 0.33 A, I_3 = 0.50 A, all correct no significant figures penalty
Unit at least once and not contradicted [1]

(ii) No mark awarded

(iii) Sensible comment about experimental inaccuracy
e.g. difficulty in reading meter/scale or meter has a zero err [1]

(d) Circuit: correct symbol for variable resistor (not potential divider) [1]
Variable resistor in a correct position [1]

(e) Workable solution, e.g. short circuit each in turn/exchange of lamp from other circuit branch/put lamps in parallel and check/use voltmeter to check pd across bulbs plus what is observed [1]

[Total: 7]

2 **(a** Correct symbol for voltmeter [1]
In parallel with lamp [1]

(b) Units all correct [1]

(ii) R values correct (10, 14, 18, 21) [1]
Consistent 2 or 3 significant figures in R column [1]

(c) Statement matches results (expect 'No') [1]
R figures quoted appropriately and matching statement [1]
Mention of brightness related to temperature [1]

[Total: 8]

3. (a) (i) 5.4 or 5.43 or 5.429 AND 5.9 or 5.94 or 5.938 [1]
R values both to 2 significant figures OR both to 3 significant figures, in table [1]

(iii) V, A , Ω [1]

(b) (i) Correct series circuit [1]
Correct symbols for ammeter, voltmeter and lamps [1]

(ii) R_T = 8.26(Ω) [1]

(c) Statement: expect No (ecf available for Yes) [1]
Outside limits of experimental accuracy (owtte) [1]

(d) Brightness changes (owtte) [1]

[Total: 9]

4 **(a** 4.29, 6.36, 8.50 [1]
consistent 2 or 3 significant figures [1]
cm, A, V, Ω in symbols or words [1]

(b) Yes [1]
Within limits of experimental accuracy [1]

(c) One of:
Switch off between readings
Use of low current (owtte) [1]

(d) Correct circuit symbol [1]
X position correct [1]

[Total: 8]

5 **(a) (i)** 0.27 (A) [1]

(ii) expect YES (ecf: no) [1]
expect close enough / within limits of experimental accuracy o.w.t.t.e.
ecf: beyond limits of experimental accuracy o.w.t.t.e. [1]

(b) vary/control current/voltage [1]

(c) (i) voltmeter symbol correct and correctly connected across all three resistors [1]

(ii) 2.2 (V) [1]

(iii) *R* correctly evaluated
ecf from **(ii)** [1]
2 or 3 significant figures and unit Ω [1]

[Total: 8]

6 **(a** $V = 0.8$ (V) [1]

(b) $V_A + V_B = 1.4$ + candidate's value for V_A, expect 2.2 V [1]
statement matching results, expect YES [1]
justified referring to results [1]

(c) $R = 7.78$, to 2 or 3 significant figures and unit Ω [1]

(d) voltmeter correctly shown [1]

(e) good <u>reason</u>, e.g. [1]
'1V scale better as V_A less than 1V' OR '10V scale acceptable to avoid changing since V_B and V_C larger than 1V'

[Total: 7]