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## Electric circuits <br> Mark Scheme 6

| Level | IGCSE |
| :--- | :--- |
| Subject | Physics |
| ExamBoard | CIE |
| Topic | Electricity and Magnetism |
| Sub-Topic | Electric circuits |
| Paper Type | (Extended) Theory Paper |
| Booklet | Mark Scheme 6 |

Time Allowed: 47 minutes
Score: /39
Percentage: /100

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1 (a) changes a.c. to d.c. OR rectifies a/c OR allows current to flow one way only OR prevents current flowing backward ..... B1
(b) I $\times$ t or $2 \times 12$ or $2 \times 12 \times 60 \times 60$ or amps $\times$ seconds ..... C1
24 Ah or 86400 C or 86000 C ..... A
(c) emf = J/C OR energy converted/work done per unit charge/coulomb OR W/A OR volts/p.d. when no current in circuitC1
12 J of energy are delivered/needed for every coulomb of charge OR 12 W is the power to drive a current of 1 A
(d) (i) series connection shown, any recognisable symbols
(iii) any power $\times$ any time or $16 \times 60 \times 60$ or IVt or $8 \times 60 \times 60 \quad$ C1 57600 J or 0.016 kWh or 28800 J or 0.008 kWh
2 (a connections such that all lamps will light ..... B1
ammeter in correct position ..... B1
variable resistor in correct position (condone poor symbol) ..... B1
switch in appropriate position (could be 2 switches) ..... B1
(b) (i) 3 A(ii) $4 \Omega$ OR $12 / \mathrm{his}(\mathrm{i})$ correctly evaluatedB1
(iii) $2 \Omega$ OR $1 / 2 \times$ his(ii) correctly evaluated ..... B1
(iv) 1080 J e.c.f. from (i) \& (ii) if working shown ..... B1
M1
(c) lamps in seriesA1less current/less p.d. (across 1 lamp)/voltage shared/higher resistance
NOT current shared

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3 (a circuit 1 series AND circuit 2 parallel
(b) switch off each one separately one fails, other works both get full current/voltage/same voltage other good point e.g. more heat in parallel lower resistance
(c) (total R =) $10(\Omega)$
( $\mathrm{V}=$ ) 12 V
(d) $1 / R=1 / 4+1 / 6(=5 / 12) O R 1 / R=1 / R_{1}+1 / R_{2}$ $2.4(\Omega)$
(e) (i) $3(\mathrm{~A})$
(ii) 24W B1
(iii) 7200J e.c.f. (ii)
$4 \quad$ (a $\quad \begin{aligned} \quad & =W / V \text { or } 9 / 6 \\ I & =1.5 \mathrm{~A}\end{aligned}$ $\mathrm{I}=1.5 \mathrm{~A}$
(b) (i) 8 ohm
(ii) 6 V
(c) (i) brightness decreases/dimmer
(ii) resistance of circuit greater current through lamp falls

B1 B1
(d) (i) 40 ohm A1
(ii) 4 ohm
(d) (i)

