# Electrical Quantities

## Mark Scheme 9

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|---|---|
| Level | IGCSE |
| Subject | Physics |
| ExamBoard | CIE |
| Topic | Electricity and Magnetism |
| Sub-Topic | Electrical quantities |
| Paper Type | (Extended) Theory Paper |
| Booklet | Mark Scheme 9 |

**Time Allowed:** **59 minutes**

**Score:** **/49**

**Percentage:** **/100**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | (a | | 1.52 kW | A1 | | |
| | (b) | (i) | Each appliance is connected across 240 V supply or equivalent | B1 | | |
| | | (ii) | Any 2: all work on same voltage or on 240 V or mains OR all have full/stated power OR each can be on or off OR one goes off/breaks others stay on | B2 | | 3 |
| | (c) | (i) | Current = power/voltage or 200/240 | C1 | | |
| | | | Current = 0.83 A | A1 | | |
| | | (ii) | Energy = power x time or 1.2 x 3 | C1 | | |
| | | | Energy = 3.6 kWh or 1.3 x $10^7$ J | A1 | | |
| | | (iii) | Current = 60/240 | C1 | | |
| | | | R= V/I or 240/0.25 | C1 | | |
| | | | R =960Ω | A1 | | 7 |
| | | | | | | [11] |

| | | | | | | |
|---|---|---|---|---|---|---|
| 2 | (a) | | I = V/R or 12/8 | 1 | | |
| | | | = 1.5 A | 1 | | |
| | (b) | (i) | 10(Ω) | 1 | | |
| | | (ii) | 2(Ω) | 1 | 2 | |
| | (c) | | power = VI or $I^2R$ or $V^2/R$ | 1 | | |
| | | | = 72W | 1 | 2 | |
| | (d) | (i) | 12(V) | 1 | | |
| | | (ii) | 6(V) | 1 | 2 | |
| | (e) | (i) | (resistance) less | 1 | | |
| | | (ii) | (resistance) less | 1 | | |
| | | | | | (10) | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 3 | (a) | (i) | use of charge = It or I = 90/45 | C1 | | |
| | | | current = 2 A | A1 | | |
| | | (ii) | resistance = voltage/current or 6/2 | C1 | | |
| | | | resistance is 3 ohm | A1 | | |
| | | (iii) | energy = Vit or Vq or 6 x 90 | C1 | | |
| | | | energy is 540 J | A1 | | 6 |
| | (b) | | idea of energy transfer | C1 | | |
| | | | is (6) J/C | A1 | | 2 |
| | | | | | | [8] |

| | | | | | |
|---|---|---|---|---|---|
| 4 | **(a)** | current = power/voltage or 150/12 | | **C1** | |
| | | value is 12.5 A | | **A1** | **2** |
| | **(b) (i)** | sum of currents at junction = current after junction/12.5 A = 5.0 A + I | | **C1** | |
| | | value is 7.5 A | | **A1** | |
| | **(ii)** | power = VI or is 7.5 x 12 e.c.f from **(i)** | | **C1** | |
| | | value is 90 W | | **A1** | |
| | **(iii)** | resistance = voltage/current or 12/7.5 e.c.f. from **(i)** but not from **(a)** | | **C1** | |
| | | value is 1.6Ω | | **A1** | **6** |
| | | | | | **[8]** |

| | | | | | |
|---|---|---|---|---|---|
| 5 | a(i) steel | | 1 | A1 | |
| | (ii) insert bar in coil/ switch on, leave, switch off) | | 1 | B1 | |
| | (iii) to control/measure current or stop circuit/coil overheating | | 1 | B1 | 3 |
| | b(i) R = 12/4 | | | C1 | |
| | = 3 ohms* | | 2 | A1 | |
| | (ii) P = 12 x 4 | | | C1 | |
| | = 48 W* | | 2 | A1 | |
| | (iii) E = 48 x 5 | | | C1 | |
| | =240 J* | | 2 | A1 | 6 |
| | c(i) 5 (V) | | 1 | A1 | |
| | (ii) sum of p.d.'s = circuit supply p.d. | | | C1 | |
| | above + detail eg across each component/ in closed circuit etc | | 2 | A1 | 3 |
| | | | | QT | 12 |