

Name of the Student: \_\_\_\_\_

Max. Marks : 23 Marks

Time : 23 Minutes

Mark Schemes

**Q1.**

- (a) potential difference  
*allow p.d.*  
*allow voltage* 1
- temperature 1  
*in this order only*
- (b) the current increases (when the potential difference increases) 1  
  
(which) causes the temperature of the filament to increase 1  
  
(so) the resistance increases  
*do **not** accept resistance increases and then levels off* 1
- (c) a higher proportion / percentage of the (total) power / energy input is usefully transferred  
*wastes less energy is insufficient*
- or**  
higher (useful) power / energy output for the same (total) power / energy input 1
- (d) potential difference increases 1  
  
current decreases 1
- (e) 1000 ( $\Omega$ )  
*reason only scores if  $R = 1000 (\Omega)$*  1  
  
potential difference is shared in proportion to the resistance  
*allow a justification using a correct calculation* 1
- (f)  $12 = I \times 7000$  1

$$I = \frac{12}{7000}$$

1

$$I = 1.71 \times 10^{-3} \text{ (A)}$$

*an answer that rounds to  $1.7 \times 10^{-3}$  (A) scores 3 marks*

1

$$I = 1.7 \times 10^{-3} \text{ (A)}$$

*this answer only*

**or**

$$I = 0.0017 \text{ (A)}$$

*an answer of  $2.4 \times 10^{-3}$  (A) scores 2 marks*

*if no other marks scored allow 1 mark for calculation of total resistance (7000  $\Omega$ )*

1

*an answer of  $1.7 \times 10^{-3}$  (A) scores 4 marks*

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## Q2.

- (a) risk of electric shock (if someone touched the case)

*allow risk of electrocution (if someone touched the case)*

1

- (b)  $2530 = I \times 230$

*this mark may be awarded if P is incorrectly / not converted*

1

$$I = \frac{2530}{230}$$

*this mark may be awarded if P is incorrectly / not converted*

1

$$I = 11 \text{ (A)}$$

*this answer only*

*an answer of 0.011 (A) scores 2 marks*

1

*an answer of 11 (A) scores 3 marks*

- (c)  $E = 2530 \times 14$

*this mark may be awarded if P is incorrectly / not converted*

1

$$E = 35\,420 \text{ (J)}$$

*this answer only*

1

$$35\,420 = m \times 4200 \times 70$$

*allow their calculated  $E = m \times 4200 \times 70$*

1

$$m = \frac{35\,420}{4200 \times 70}$$

$$\text{allow } m = \frac{\text{their calculated } E}{4200 \times 70}$$

1

$$m = 0.12 \text{ (kg)}$$

*allow an answer that is consistent with their calculated value of E*

1

**[9]**