

Name of the Student: _____

Max. Marks : 21 Marks

Time : 21 Minutes

Mark Schemes

Q1.

(a) current 1

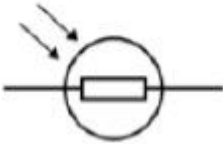
(b) $4.2 = 3.5 \times 10^{-3} \times R$ 1 $R = 4.2 / 3.5 \times 10^{-3}$ 1
 $R = 1200 (\Omega)$
an answer of 1200 (Ω) scores 3 marks
an answer of 1.2 scores 2 marks 1

(c) conversion from minutes to seconds (300 s) 1

 $Q = 0.0035 \times (5 \times 60)$ 1
 $Q = 1.05 \text{ C}$
an answer of 1.05 (C) scores 3 marks
an answer of 17.5 scores 1 mark
an answer of 1050 or 0.0175 scores 2 marks 1

(d) (potential difference) increases 1

 (because thermistor) resistance increases
2nd mark dependent on scoring 1st mark 1

 (e)  1
[10]**Q2.**

(a) current at 0.5 V = 0.91 (A) 1

$$P = 0.91 \times 0.5$$

1

$$P = 0.455 \text{ (W)}$$

an answer of 0.455 (W) scores 3 marks

1

(b) straight line with positive gradient

allow for 1 mark a straight line that passes through (0.1, 0)

1

positive y-axis intercept

ignore any values on y-axis

1

(c)
$$0.15 = \frac{0.52}{\text{total P}}$$

1

$$\text{total P} = 3.47 \text{ (W)}$$

1

$$\text{area} = \frac{3.47}{450}$$

1

$$\text{area} = 7.7 \times 10^{-3} \text{ (m}^2\text{)}$$

an answer of $7.7 \times 10^{-3} \text{ (m}^2\text{)}$ scores 4 marks

allow use of student's calculated incorrect total power for last 2 marking points

1

(d) connect the solar cells in parallel

1

(so that) the current has multiple paths it can take

or

the total resistance is less than the resistance of one solar cell

1

[11]