

Name of the Student: _____

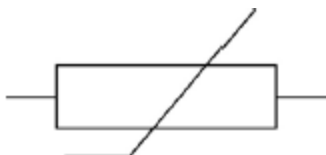
Max. Marks : 22 Marks

Time : 22 Minutes

Mark Schemes

Q1.

(a) (i)



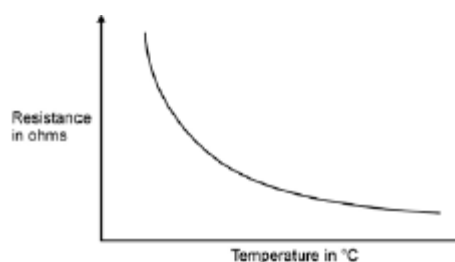
1

(ii) 360

allow 1 mark for correct substitution, ie $9 = 0.025 \times R$

2

(iii) sketch graph of correct shape, ie



1

(iv) An automatic circuit to switch a heating system on and off.

1

(b) so ammeter reduces / affects current as little as possible

accept so does not reduce / change the current (it is measuring)

accurate reading is insufficient

not change the resistance is insufficient

1

(c) gives a common understanding

accept is easier to share results

accept can compare results

do not need to be converted is insufficient

prevent errors is insufficient

1

(d) replace Bunsen (and water) with a lamp

accept any way of changing light level

1

replace thermometer with light sensor
 accept any way of measuring a change in light level
 datalogger alone is insufficient

1

[9]

Q2.

- (a) water heated by radiation (from the Sun)
 accept IR / energy for radiation

1

water used to heat buildings / provide hot water
 allow for **1** mark heat from the Sun heats water if no other marks given
 references to photovoltaic cells / electricity scores **0** marks

1

- (b) 2 (minutes)

$$1.4 \times 10^3 = \frac{168 \times 10^3}{t}$$

gains **1** mark

calculation of time of 120 (seconds) scores **2** marks

3

- (c) (i) 150 (kWh)

1

- (ii) £60(.00) or 6000 (p)
 an answer of £6000 gains **1** mark
 allow **1** mark for $150 \times 0.4(0)$ 150×40
 allow ecf from **(c)(i)**

2

- (iii) 25 (years)
 an answer of $6000 / 240$
or
 $6000 / \text{their } (c)(ii) \times 4$
 gains **2** marks
 an answer of $6000 / 60$
or
 $6000 / \text{their } (c)(ii)$ gains **1** mark, ignore any other multiplier of **(c)(ii)**

3

- (iv) any **one** from:

- will get £240 per year
 accept value consistent with calculated value in **(c)(iii)**
- amount of light is constant throughout the year
- price per unit stays the same
- condition of cells does not deteriorate

1

- (d) any **one** from:

- angle of tilt of cells
- cloud cover
- season / shade by trees

- amount of dirt