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Exam Preparation and Free Resources

Name of the Student:_____

Max. **Marks : 25 Marks**   **Time : 25 Minutes**

Mark Schemes

Q1.

(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 × 0.4(0) 150 × 40*
*allow ecf from **(c)(i)***

2

(iii)   25 (years)
an answer of 6000 / 240
or
*6000 / their **(c)(ii)** × 4*
*gains **2** marks*
an answer of 6000 / 60
or
*6000 / 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

(d)   any **one** from:

        • angle of tilt of cells
        • cloud cover
        • season / shade by trees
        • amount of dirt

1

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Q2.

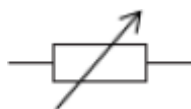(a)   (i)   symbol for a diode

        accept

1

symbol for a variable resistor

1

       (ii)   voltmeter is in series **or** voltmeter is not in parallel

1

ammeter is in parallel **or** ammeter is not in series
        accept an answer in terms of how the circuit should be corrected
        voltmeter and ammeter are wrong way around is insufficient

1

(b)   (i)   0.2 (V)
        accept any value between 0.20 and 0.21 inclusive

1

       (ii)   37.5
        allow 1 mark for I = 0.008
        or
        allow 2 marks for correct substitution, ie 0.3 = 0.008 × R
        or
        allow 1 mark for a correct substitution using I = 0.8 or I = 0.08
        or I = 0.009
        or
        allow 2 marks for answers of 0.375 or 3.75 or 33(.3)

3

(c)   (i)   25
        allow 1 mark for obtaining period = 0.04(s)

2

       (ii)   diode has large resistance in reverse / one direction

1

so stops current flow in that / one direction
        allow diodes only let current flow one way / direction
        allow 1 mark for the diode has half-rectified the (a.c. power) supply

1

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