

task_f64r8g2jf4pdomfi_with_calculation

Student Group

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conversions, energy, power, area, chapter1 1

Exercise E14 Conversion: Energy, Power and Area

2. The solar panels and the car (type of the car is not specified) are located in an average 100 km and an usable battery capacity of 60 kWh. Solar panels produces per 1 m² in average in December 0.2 kWh/m². The car is driven 50 km per day. The size of a distinct solar module with 460 Wp (Watt peak) is 1.9 m times 1.1 m.

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\begin{align*}
W &= 460 \text{ (Watt)} \\
A &= 1.9 \text{ (m)} \cdot 1.1 \text{ (m)} \\
\end{align*}
.. What is the average power consumption of the car per day?
\begin{align*}
A \cdot 0.2 \text{ (kWh/m}^2) &= 460 \text{ (W)} \cdot A \cdot 24 \text{ (h)} \\
0.2 \text{ (kWh/m}^2) \cdot A &= 460 \text{ (W)} \cdot A \cdot 24 \text{ (h)} \\
\end{align*}
\begin{align*}
W &= 460 \text{ (W)} \\
A &= 1.9 \text{ (m)} \cdot 1.1 \text{ (m)} \\
\end{align*}
\begin{align*}
\frac{W}{A} &= \frac{460 \text{ (W)}}{1.9 \text{ (m)} \cdot 1.1 \text{ (m)}} = 219.05 \text{ (W/m}^2) \\
\frac{W}{A} &= 219.05 \text{ (W/m}^2) \\
\end{align*}
\begin{align*}
\frac{W}{A} &= \frac{16 \text{ (kWh)}}{100 \text{ (km)}} = 0.16 \text{ (kWh/km)} \\
\frac{W}{A} &= 50 \text{ (km)} \cdot 0.16 \text{ (kWh/km)} = 8 \text{ (kWh)} \\
\end{align*}

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