

task_239xqp7zjr32bv4a_with_calculation

Student Group

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conversions, speed, energy, power, chapter1 1

Exercise E1 Conversions: Speed, Energy, and Power

2. The energy of a 600 kV high-voltage transmission line (positive charge) is 16 kJ in a 100 m section. The charge of about $1.6 \cdot 10^{-19}$ C is on each electron.
 1. A vehicle speed of $80 \frac{\text{km}}{\text{h}}$ is $\frac{\text{m}}{\text{s}}$

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Solution
fast Solution
\begin{align*} \frac{1'000 \text{ m}}{3'600 \text{ s}} = 80 \frac{\text{m}}{3.6 \text{ s}} \quad \&= 22.22 \frac{\text{m}}{\text{s}} \end{align*}
\begin{align*} 16 \text{ kJ} = 16'000 \text{ J} = 16'000 \text{ Ws} = 16 \text{ Ws} \cdot 1'000 = 16'000 \text{ Ws} \end{align*}
\begin{align*} 16'000 \text{ Ws} \cdot \frac{1 \text{ kW}}{1'000 \text{ W}} = 16 \text{ kW} \cdot \text{day} \end{align*}
\begin{align*} 16 \text{ kW} \cdot \text{day} = 16 \text{ kW} \cdot 24 \text{ h} = 384 \text{ kWh} \end{align*}
\begin{align*} 384 \text{ kWh} = 384 \text{ kWh} \cdot \frac{1 \text{ MWh}}{1'000 \text{ kWh}} = 0.384 \text{ MWh} \end{align*}
\begin{align*} 0.384 \text{ MWh} = 0.384 \text{ MWh} \cdot \frac{1 \text{ GWh}}{1'000 \text{ MWh}} = 0.000384 \text{ GWh} \end{align*}
\end{pre>

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