task_239xqp7zjr32bv4a_with_calculation

Student Group

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Exercise E7 Conversions: Speed, Energy, and Power

[illegible]
1. A vehicle speed of $80.00~{\rm {km}\over{h}}$ in ${\rm {m}\over{s}}$

Solution
Fast Solution

$$\begin{align*} v &= 80.00~{\rm {km}\over{h}} = {{80'000~m}\over{3'600~s}} = 80~{\rm {m}\over{3.6~s}} \\ &= 22.22~{\rm {m}\over{s}} \end{align*}$$

$$\begin{align*} P &= 60.0~{\rm kW} = 60.0~{\rm {kJ}\over{s}} = 0.06~{\rm {MJ}\over{s}} = 0.06~{\rm {MJ}\over{day}} \cdot {{1~day}\over{24~h}} \cdot {{1~h}\over{60~min}} \cdot {{1~min}\over{60~s}} \\ &= 0.06~{\rm {MJ}\over{day}} \cdot {{1~day}\over{1440~min}} \cdot {{1~min}\over{60~s}} = 0.06~{\rm {MJ}\over{day}} \cdot {{1~day}\over{86'400~s}} \\ &= 0.06~{\rm {MJ}\over{day}} \cdot {{1~day}\over{86.4~ks}} = 0.06~{\rm {MJ}\over{day}} \cdot {{1~day}\over{86.4~{\rm {numerical value}}}} \\ &= 0.06~{\rm {MJ}\over{day}} \cdot {{1~day}\over{86.4}} = 0.06~{\rm {MJ}\over{day}} \cdot {{1~day}\over{24 \cdot 60 \cdot 60}} \\ &= 0.06~{\rm {MJ}\over{day}} \cdot {{1~day}\over{864'000~s}} \\ W_{\rm absorbed} &= 1~{\rm µW} \cdot 864'000~{\rm s} \\ &= 864'000~{\rm µWs} \\ &= 864~{\rm mWs} \\ &= 0.864~{\rm Ws} \\ &= 0.864~{\rm J} \end{align*}$$

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