

Lösungen Übungen Energie

$$\begin{aligned} 1. \quad E_{pot} &= m \cdot g \cdot h \\ &= 22kg \cdot 9,81 \frac{m}{s^2} \cdot 10m \\ &= 2158,2 J \end{aligned}$$

$$\begin{aligned} 2. \quad E_{kin} &= \frac{1}{2} \cdot m \cdot v^2 \\ &= \frac{1}{2} \cdot 900kg \cdot \left(27,8 \frac{m}{s}\right)^2 \\ &= 347778 J \end{aligned}$$

$$\begin{aligned} 3. \quad E_{therm} &= c_w \cdot m \cdot \Delta T \\ &= 4,19 \frac{kJ}{kg \cdot K} \cdot 2kg \cdot 80K \\ &= 670,4 kJ \end{aligned}$$

$$\begin{aligned} 4. \quad E_{el} &= U \cdot I \cdot t \\ &= 12V \cdot 0,6A \cdot 600s \\ &= 4320 J \end{aligned}$$

$$\begin{aligned} 5. \quad E_{kin} &= \frac{1}{2} \cdot m \cdot v^2 \\ &= \frac{1}{2} \cdot 10kg \cdot \left(5,6 \frac{m}{s}\right)^2 \\ &= 156,8 J \end{aligned}$$

$$\begin{aligned} E_{pot} &= m \cdot g \cdot h \\ h &= \frac{E_{pot}}{m \cdot g} = \frac{156,8J}{10kg \cdot 9,81 \frac{m}{s^2}} = 1,6m \end{aligned}$$

$$\begin{aligned} 6. \quad a) \quad E_{el} &= U \cdot I \cdot t \\ &= 12V \cdot 0,2A \cdot 240s \\ &= 576 J = 0,576 kJ \end{aligned}$$

$$\begin{aligned} E_{therm} &= c_w \cdot m \cdot \Delta T \\ \Delta T &= \frac{E_{therm}}{c_w \cdot m} = \frac{0,576kJ}{4,19 \frac{kJ}{kg \cdot K} \cdot 0,5kg} = 0,3K = 0,3^\circ C \end{aligned}$$

$$b) \quad E_{el} = 33120 J = 33,120 kJ$$

$$\Delta T = 15,8K = 15,8^\circ C$$