

## Chapter 6 Problem 42 <sup>†</sup>

### Given

$$P_{hd} = 1.20 \text{ kW} = 1,200 \text{ W}$$

$$t_{hd} = 10.0 \text{ min} = 600 \text{ s}$$

$$P_{nl} = 7.00 \text{ W}$$

$$t_{nl} = 24.0 \text{ h} = 86,400 \text{ s}$$

### Solution

Find out which consumes the most energy.

First convert to SI units. This has been done and recorded above. The energy consumed by the hair dryer is

$$P = \frac{W}{t} \quad \Rightarrow \quad W = Pt$$

$$W_{hd} = P_{hd}t_{hd} = (1,200 \text{ W})(600 \text{ s}) = 720,000 \text{ J} = 720 \text{ kJ}$$

The energy consumed by the night light is

$$W_{nl} = P_{nl}t_{nl} = (7.00 \text{ W})(86,400 \text{ s}) = 604,800 \text{ J} = 605 \text{ kJ}$$

The night light uses slightly less power.

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<sup>†</sup>Problem from Essential University Physics, Wolfson