

33. (a) Electrical energy is converted to heat at a rate given by

$$P = \frac{V^2}{R} ,$$

where V is the potential difference across the heater and R is the resistance of the heater. Thus,

$$P = \frac{(120 \text{ V})^2}{14 \Omega} = 1.0 \times 10^3 \text{ W} = 1.0 \text{ kW} .$$

- (b) The cost is given by

$$(1.0 \text{ kW})(5.0 \text{ h})(5.0 \text{ cents/kW} \cdot \text{h}) = 25 \text{ cents} .$$