57. The rate of heat flow is given by

$$P_{\text{cond}} = kA\,\frac{T_H - T_C}{L}\,,$$

where k is the thermal conductivity of copper ($401\,\text{W/m}\cdot\text{K}$), A is the cross-sectional area (in a plane perpendicular to the flow), L is the distance along the direction of flow between the points where the temperature is T_H and T_C. Thus,

$$P_{\text{cond}} = \frac{(401\,\text{W/m}\cdot\text{K})(90.0\times10^{-4}\,\text{m}^2)(125^\circ\text{C} - 10.0^\circ\text{C})}{0.250\,\text{m}} = 1.66\times10^3\ \text{J/s}\ .$$

The thermal conductivity is found in Table 19-6 of the text. Recall that a change in Kelvin temperature is numerically equivalent to a change on the Celsius scale.