

Week1

Tasks :

A short summary about the conductive heat transfer and solving the same exercise with $L = 0.4 \text{ m}$, $A = 20 \text{ m}^2$, $\Delta T = 25$, and $k = 0.78 \text{ W/m K}$ using both simple method and using the resistance concept

Summary:

Heat transfer is heat travels from the warmer part of a body to the cooler part of the body in a way called heat conduction.

Calculation:

(1) simple method

$$\dot{Q} = KA \frac{\Delta T}{L} = 0.78 \frac{\text{W}}{\text{mK}} * 20 \text{m}^2 * \frac{25}{0.4 \text{m}} = 975 \text{W}$$

(2) resistance concept

$$R_{\text{wall}} = \frac{L}{KA} = \frac{0.4 \text{m}^2}{0.78 \frac{\text{W}}{\text{mK}} * 20} = \frac{1}{39} \frac{^\circ\text{C}}{\text{W}}$$

$$\dot{Q} = \frac{\Delta T}{R_{\text{wall}}} = \frac{25}{\frac{1}{39} \frac{^\circ\text{C}}{\text{W}}} = 975 \text{W}$$