

Week Assignment 1

Question

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

Summary

Conductive heat transfer defines the transfer of heat by the means of molecular movement in solids. The heat transfer occurs in the same direction, from higher to lower temperatures tending to balance each others.

Solution

Using Simple Method,

$$\begin{aligned}\dot{Q} &= kA \frac{\Delta T}{L} \\ &= 0.78 * 20 * \frac{25}{0.4} = 975 \text{ W}\end{aligned}$$

Using the Resistance Concept,

$$\begin{aligned}R_{\text{wall}} &= \frac{L}{kA} \\ &= \frac{0.4}{0.78 * 20} = 0.02564 \text{ }^{\circ}\text{C/W}\end{aligned}$$

$$\begin{aligned}\dot{Q} &= \frac{\Delta T}{R_{\text{wall}}} \\ &= \frac{25}{0.02564} = 975.0390 \text{ W}\end{aligned}$$