

WEEK 1 SUBMISSION

QUESTION 1:

A short summary about the conductive heat transfer.

ANSWER 1:

Conductive heat transfer takes place in solids because of temperature differences between various parts of the solid. Thermal energy is transferred from hotter to lower regions via vibrations of adjacent molecules or the movement of free electrons through the material.

QUESTION 2:

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.

ANSWER:

1. Simple Method:

$$Q_{\text{cond.wall}} = kA \frac{\Delta T}{L} = 0.78 \text{ W/m K} * 20 \text{ m}^2 * 25 / 0.4 \text{ m} = 936 \text{ W}$$

2. Resistance Concept:

$$R_{\text{wall}} = L/kA = 0.4 \text{ m} / 0.78 \text{ W/m K} * 20 \text{ m}^2 \approx 0.02564 \text{ K/W}$$

$$Q = \Delta T / R_{\text{wall}} = 25 / 0.02564 \text{ K/W} \approx 975.04 \text{ W}$$